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ABSTRACT

Weather has shaped United States' culture, national character and folklore; at times it has changed the course of history. The seven accounts compiled in this publication highlight some of the nation's weather experiences from the hurricanes that threatened Christopher Columbus to the peculiar run of bad weather that has plagued American presidents on Inauguration Day. Also presented are meteorological phenomena encountered by people who documented weather and climate during the Revolutionary and Civil Wars and those who suffered through the "year without a summer," the Blizzard of '88, and the dustbowl drought of the 1930's. Numerous historical photographs illustrate the entries. (Author/WB)

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American Weather Stories

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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American Weather Stories

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AMERICAN WEATHER

American weather has helped shape our culture, national character, folklore, and conversation. It has frequented the pages of our history and, at times, changed its course.

The stories that follow trace the American weather experience from the hurricanes that threatened Columbus and colonial settlers to the peculiar run of bad weather that has plagued American presidents on Inauguration Day; from Americans who documented the weather and climate of the Revolutionary and Civil War eras to those who suffered through the "year without a summer," the Blizzard of '88, and the dust-bowl drought of the 1930's.

ACKNOWLEDGMENTS

With one exception, earlier versions of the following stories appeared in magazines of the National Oceanic and Atmospheric Administration (NOAA) and its predecessors. "Hurricanes Haunt Our History" is reprinted (with considerable revision) with permission from the June 1963 issue of COLUMBIA Magazine, New Haven, Conn.

The stories were written by the author, except "View From a Civil War Cornfield," which is the work of Joseph T. Caldwell, a Civil War farmer. Caldwell's observations were edited and first published by William T. Hodge of the National Climatic Center.

The author owes a particular debt of gratitude to Mrs. Joanne David of NOAA's Visual Services Branch for the long hours she spent tracking down and obtaining many key photographs that add so much to the historical value of the book.

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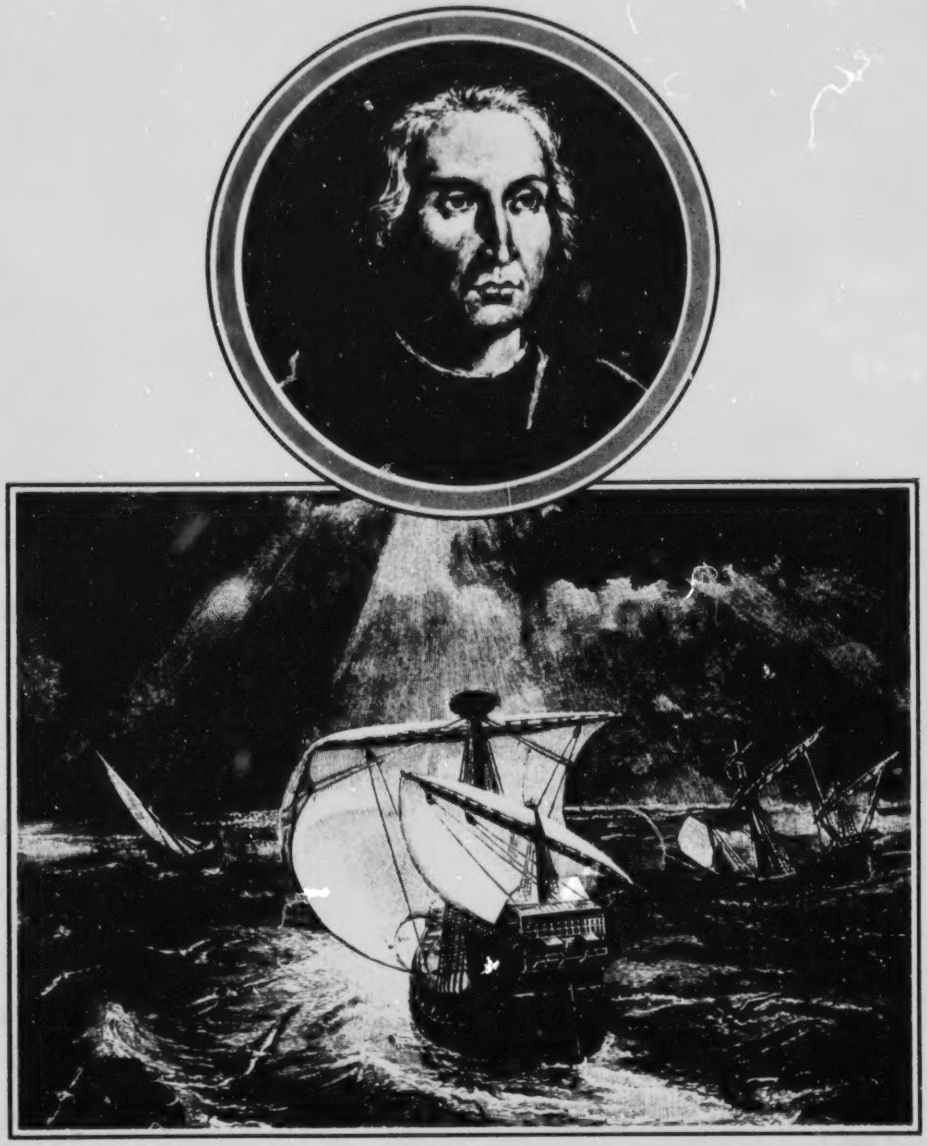


Christopher Columbus was intimately acquainted with hurricanes.

Hurricanes
Haunt
Our History

HURRICANES HAUNT OUR HISTORY

From the beginning, hurricanes have played an awesome role in the American panorama. They have touched the lives of Americans great and small and, at times, changed the course of our destiny—as well as the shape of our coastline. There also have been hurricanes whose effects were felt on the shores of the Old World, as well as the New.

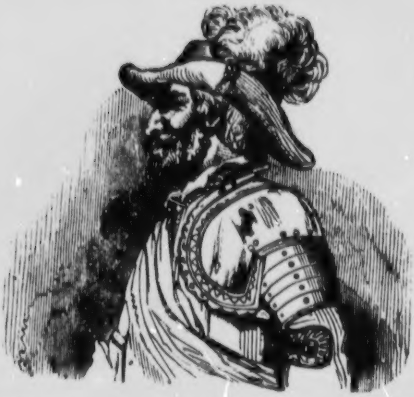
Christopher Columbus was intimately acquainted with hurricanes. Arriving off Hispaniola on his fourth and final voyage in the summer of 1502, the aging Admiral, now fallen from favor, read the signs of an approaching storm. He requested the shelter of Santo Domingo harbor, but was refused. Instead, ignoring Columbus' warning, some 30 vessels, many loaded with gold and slaves, sailed proudly out of the harbor for Spain. Francisco de Bobadilla, Columbus' mortal enemy, sailed on the flagship.

Twenty ships and over 500 men, including de Bobadilla, were never seen again. Only one vessel reached Spain—a small, leaky ship grudgingly assigned to carry back to Spain the proceeds from the sale of Columbus' few remaining Island properties, his guarantee of an independent old age.

Columbus himself, a weatherwise seaman, rode out the hurricane safely at anchor in an island cove. Meanwhile, Santo Domingo was smashed flat—for the first of many times.

It is fortunate indeed that Columbus did not encounter a hurricane on his first voyage, out on the open sea. His three tiny caravels might well have perished, delaying the discovery of the New World and changing the course of our history.

In August 1508, Ponce de Leon encountered two hurricanes. The first drove his ship onto the rocks in the port of Yuna, Hispaniola; 13 days later, a second cyclone beached the same vessel on the southwest coast of Puerto Rico. Hernando Cortes, whose discovery of treasure focused the covetous gaze of Europe on the newly discovered lands to the west, lost the first vessel he sent to Mexico in a severe hurricane in October 1525. Captain Juan de Avalos (a relative of Cortes), two Franciscan friars, and some 70 seamen were drowned.



Ponce de Leon was the victim of two ship-wrecking hurricanes.

Soon annual treasure fleets were carrying the riches of the virgin continent back to the war-depleted coffers of Spain. Each year the fleet assembled in Havana, scheduled to sail for Spain in March. Each year fiestas, banquets, and religious ceremonies stretched the departure date to August, and even to September, at the height of the hurricane season. Many ships sailed from Havana; often only a handful reached Spain. It is said that a ship was sunk for every lonely mile of the unexplored Florida coast.

In July 1609, a small fleet of ships crowded with settlers for the Virginia colonies was overwhelmed by a hurricane. One sank immediately; the others were scattered. All but one of the surviving vessels managed to limp into Jamestown. The *Sea Adventure,* flagship of the fleet, was given up for lost. Ten months later, however, her passengers and crew arrived at Jamestown in a small boat built from the wreckage of the flagship. They had foundered on the rocks of Bermuda.

The voyagers had found Bermuda a natural paradise. An account of their adventure was published in London in 1612, intriguing an English playwright. His interest in the tale led William Shakespeare to write his beautiful play, "The Tempest"—one of the happiest endings a hurricane story ever had.

HURRICANES HAUNT OUR HISTORY

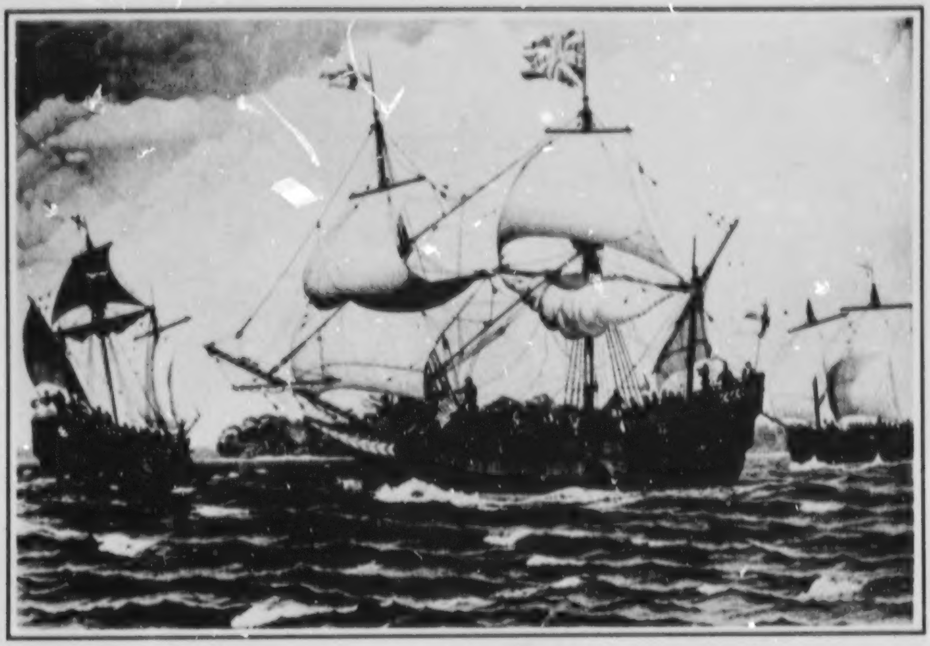
Throughout the long colonial period of American history, the predominantly low-lying coastal settlements were repeatedly raked by hurricanes. The terrible storms struck without warning, unroofing, flooding, and washing away homes; destroying crops; tearing up great trees by their roots; sinking ships or stranding them in village streets, forests, and cornfields. The cyclones often killed settlers, sailors, and travelers by the hundreds, occasionally, by the thousands. They blew down great forest areas and made travel impossible for months, isolating stricken survivors, who often faced the threat of famine in the coming winter.

On the night of August 13, 1766, the tiny village of Trois-Islets, on the island of Martinique in the French West Indies, was crushed by a hurricane. Joseph-Gaspard Tascher, a wealthy planter, was wiped out by the storm, his family poverty stricken. Later one of his daughters, Marie Josephine Rose, returned to France to seek her fortune. There she caught the fancy of an ambitious young army officer, whom she married.

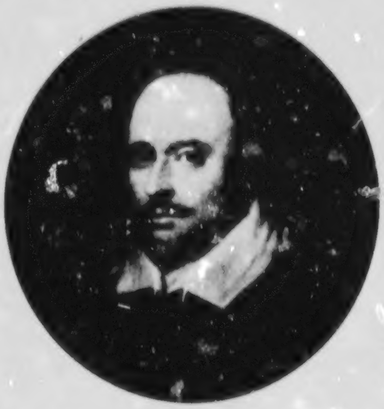
If it hadn't been for that hurricane, Marie might well have spent her days on Martinique, a belle of island society. Instead she became the Empress Josephine of France when her husband, Napoleon Bonaparte, rose to power. A hurricane in the New World was felt in the Old—as they are to this day.

It was a hurricane that brought Alexander Hamilton into the pages of American history. His description, in a letter to his father, of a terrible storm that ravaged the island of St. Croix in the West Indies on August 30 and September 1, 1772, so impressed local planters that they took up a collection to send Hamilton to America for an education. He was there in 1774, a student at King's College (now Columbia University) in New York when the first rumblings of revolution were heard.

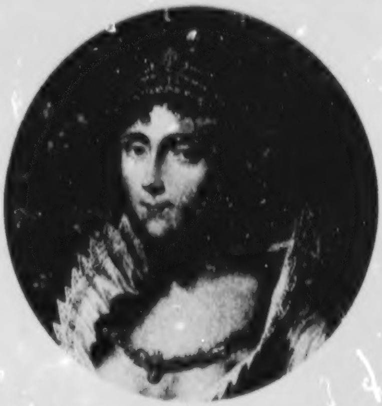
In August 1778, a hurricane mauled and separated warships of British and French fleets maneuvering for battle south of Newport, R.I. Two years later, a British fleet east of Daytona Beach, Fla., was savaged by an early October hurricane, then, a few days later, struck



In 1609, a small fleet of vessels bound for Virginia was ravaged by a hurricane. The flagship foundered on the rocks of Bermuda.



The voyagers' Bermuda adventure (above) was the inspiration for William Shakespeare's last play, "The Tempest," one of his most beautiful works.



After a hurricane ruined her father, Marie Josephine Tascher went to France to seek her fortune and later became the Empress Josephine.

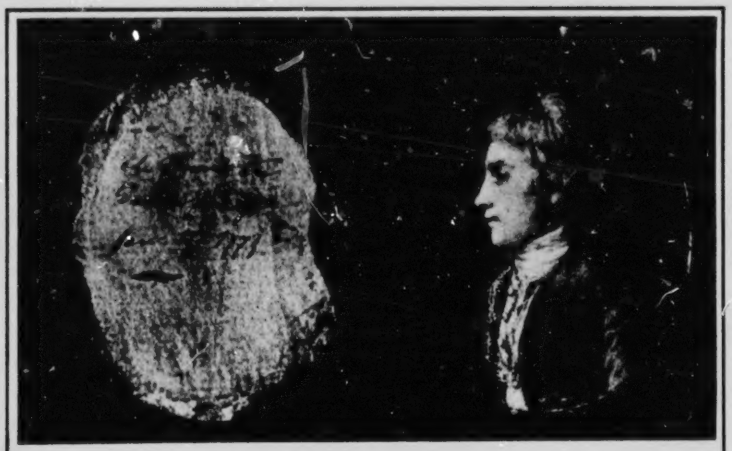
by a second storm near Bermuda. Meanwhile, the first cyclone scattered and badly damaged a second British fleet off the Virginia Capes, then roared northward to strike yet another British squadron off Rhode Island. It has been said that the final British surrender at Yorktown in October 1781 was at least partly due to the British Navy's reluctance to engage the French fleet blockading General Cornwallis during the dangerous fall hurricane season.

In September 1815, just months after the War of 1812 ended, the worst hurricane since 1635 roared through New England at 50 miles per hour and left a path of destruction from the south shore of Long Island, N.Y., northward through New Hampshire.

One of the most nortorious hurricanes of the 19th Century demolished a fledgling American settlement on Galveston Island in the newly proclaimed Republic of Texas in early October 1837. According to an eyewitness, ". . . every house, camp, sod house, and inhabited structure was swept away, except the Old Mexican customhouse. . . ." Only one of 30 vessels in Galveston Harbor held to its mooring; the rest were driven aground or blown out to sea. "Men, women, and children were seen floating upon boards, logs, and small boats, for days and nights, in every part of the island. Miraculously, only one life was lost." Unfortunately, the hurricane was far from finished.

Eight days later, the brand new paddle-wheel steamer, *Home,* was beached and demolished just south of Cape Hatteras, N.C., by the same storm. There were only two life preservers on the ship. Forty of her 130 passengers struggled ashore to safety; the rest, mostly women and children, were drowned. Because of this disaster, Congress passed a law requiring all American vessels to carry a life preserver for each passenger—a law that has since saved many Americans from a watery grave.

On October 29, 1861, the Federal "Expedition," the largest fleet of American warships and transports yet assembled, sailed south from Chesapeake Bay to attack Confederate coastal installations. As the fleet rounded the Carolina Capes on November 2, it was staggered



Alexander Hamilton (Age 15) Describes a Hurricane

"Good God! what horror and destruction! It is impossible for me to describe it or for you to form any idea of it. It seemed as if a total dissolution of nature was taking place. The roaring of the sea and wind, fiery meteors flying about in the air, the prodigious glare of almost perpetual lightning, the crash of falling houses, and the earpiercing shrieks of the distressed were sufficient to strike astonishment into Angels. A great part of the buildings throughout the island are levelled to the ground; almost all the rest very much shattered, several persons killed and numbers utterly ruined—whole families roaming about the streets, unknowing where to find a place of shelter—the sick exposed to the keenness of water and air, without a bed to lie upon, or a dry covering to their bodies, and our harbors entirely bare. In a word, misery, in its most hideous shapes, spread over the whole face of the country."

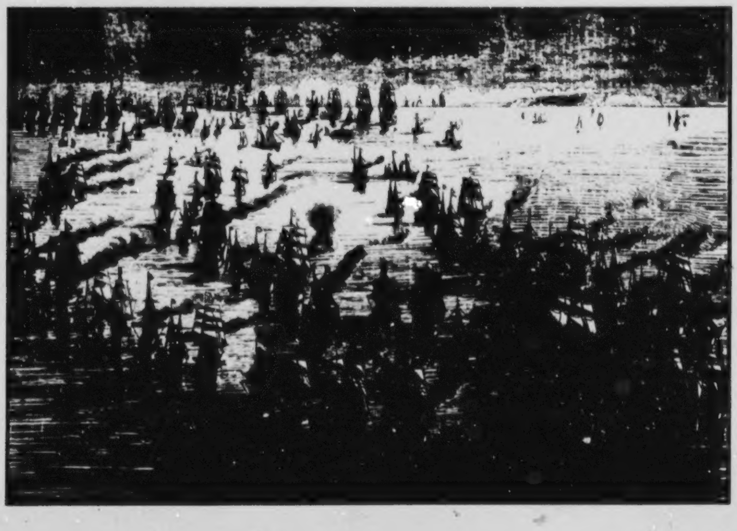
Excerpt from a letter to his father written on St. Croix Island in the West Indies, September 6, 1772, following a hurricane.

by a hurricane that sank two vessels and scattered the rest. The fleet managed to regroup, however, and, on November 7, captured Port Royal Sound, S.C.

When the *Maine* was sunk in Havana harbor in 1898, the United States declared war on Spain. The hurricane season was fast approaching. Fearful for the safety of American naval units soon to be operating in hurricane waters, Willis L. Moore, Chief of the Weather Bureau, went to see President McKinley to urge the establishment of hurricane warning stations in the West Indies. Impressed by Moore's arguments, McKinley declared that he was more afraid of a hurricane than he was of the Spanish Navy. He ordered Moore to organize the warning system immediately.

A battle fleet left Spain steaming westward. Concern spread along the east coast of the United States. Observation posts were hurriedly built at key points . . . emergency plans made—all for nothing. The Spanish fleet was trapped in the harbor at Santiago,

The Federal "Expedition" leaves Chesapeake Bay to attack Confederate coastal installations.



Willis Moore, Chief of the Weather Bureau, and President McKinley feared for American naval units operating in hurricane waters during the Spanish-American War.

Cuba, and destroyed. The war ended. Not a single hurricane had appeared . . . no American ships or men had been lost . . . as they might have been. The hurricanes came late that year, or they might have played a role in the drama that marked the end of Spanish power in the New World—as they had at its beginning, four centuries before.

Those coastal lookout stations, built for a Spanish attack that never came, were abandoned by the Navy. A little later they were taken over by the Weather Bureau as hurricane observation posts. Upon inventory, the installation at Carolina Beach, N.C., was found to lack a most desirable piece of equipment—its privy had disappeared. Intensive investigation disclosed that a local citizen, admiring its quality, had appropriated it for his nearby property. There was such a fuss made that the outhouse was reluctantly returned . . . only to be completely demolished in the hurricane surf of October 2, 1898, immortalizing to this day the "Privy Hurricane."

With the exception of a handful of pioneers, it is only in comparatively recent times that man has probed the nature and habits

The steeple of Boston's historic Old North Church is toppled by Hurricane Carol (1954). The steeple was built in 1806 to replace the original, also toppled by a hurricane (1804).

HURRICANES HAUNT OUR HISTORY

The average hurricane lives about 9 days, but some have been tracked for 4 and even 5 weeks. Centuries before European explorers and settlers were exposed to their devastation, native Americans trembled helplessly before the brutal force of their seemingly infinite winds. The word hurricane itself is thought to be derived from the Carib Indian's word for evil spirit.

Hurricanes were first mentioned in the logs of Christopher Columbus, their earliest European student. After Columbus, the next major contribution to man's knowledge of the hurricane was made by Benjamin Franklin.

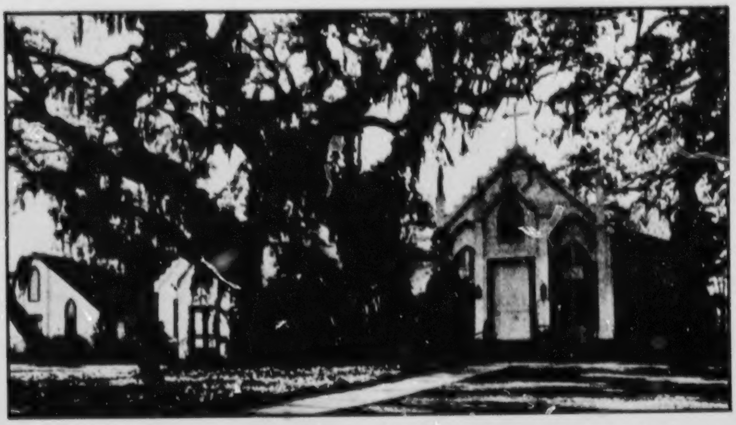
On November 2, 1743, a "noreaster," actually the outer fringes of a hurricane raging offshore, hit Philadelphia, obscuring an expected eclipse of the Moon. Franklin, learning that the eclipse was seen at Boston (because the storm reached there later than Philadelphia) realized that the "noreaster" had moved from the southwest—despite surface winds from the opposite direction.

Six years later, Franklin verified his theory by tracking the progress of another hurricane from North Carolina through New

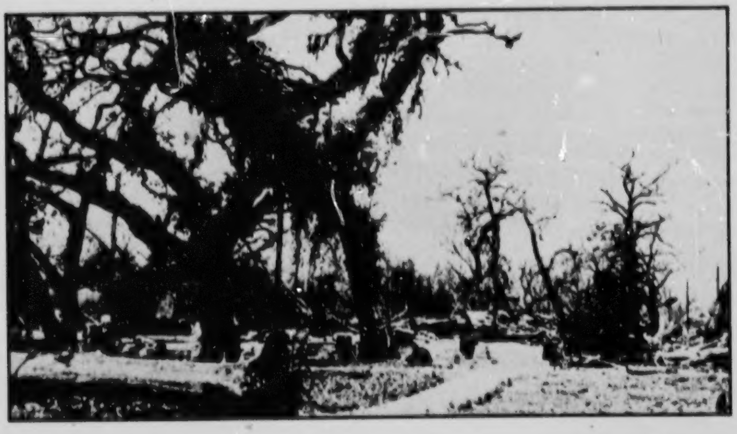
Hurricane winds drove this ten-foot-long pine board through the heart of a royal palm tree.

of hurricanes. We know more about these colossal storms today, from our vantage point in time and knowledge, than our forefathers ever knew . . . even as the hurricane winds howled around them and they fought for their lives.

Hurricanes are born at sea, over the warm waters near the Equator. Like people, no two identical hurricanes have ever been seen.



Trinity Episcopal Church, Pass Christian, Miss., built in 1849, before and after the passage of Hurricane Camille (1969).



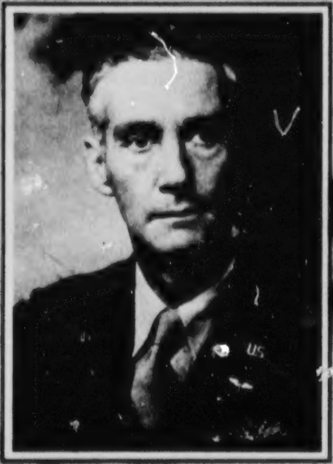
England. This independent motion of a storm was a novel and important concept. As usual, Franklin was years ahead of his time. It wasn't until the middle of the nineteenth century that it was realized that all storms are actually circular wind systems, moving from one place to another.

In 1831, William Redfield, a Yankee student of the hurricane, showed that these giant storms were "rotary," with the winds blowing from all directions around a slowly moving center. He also traced long curved hurricane tracks from the West Indies to the east coast of the United States mainland. Later, Henry Piddington, an Englishman sent to study the devastating tropical storms of India, coined the term "cyclone" (from a Greek word meaning "the coils of a snake") to describe all rotary storms.

Perhaps the man who contributed the most to our present-day knowledge of hurricanes was Benito Viñes, a Jesuit priest, and the director of the College of Belén in Havana from 1870 until his death in 1893. During those years, Father Viñes devoted all his time to the study of the hurricane, so that the Cuban people might be spared the needless tragedy a few hours' warning could prevent.

Father Viñes early established a hurricane alarm system throughout Cuba, including a "pony express" between the most isolated villages. He received telegraph warnings flashed by cable from nearby islands, as well as reports from the ships reaching their ports. He organized hundreds of volunteer observers all around the long Cuban coastline. This far-flung network enabled Father Viñes to track and to study hurricanes with a degree of thoroughness unknown until this day.

Although his discovery of the forecast value of those icy cloud fingers which reach across the sky ahead of the storm's body is considered his greatest achievement, there were many others, all confirmed by later investigators, who marvelled at what he accomplished. From Father Viñes' point of view, the most important thing was that his forecasts saved countless lives and untold misery; for the first time, his people had a chance.

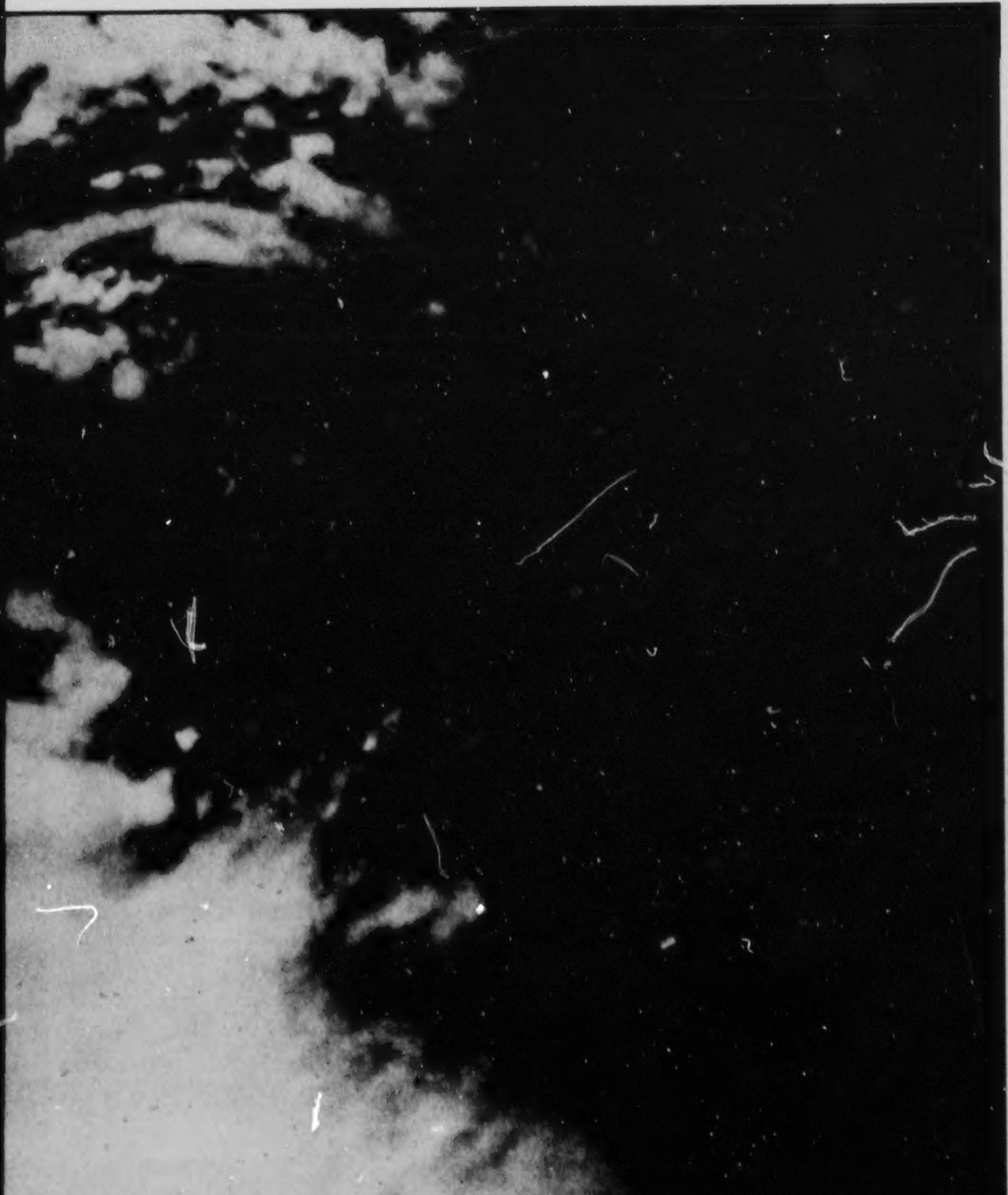


Col. Joseph Duckworth.

[illegible], a U.S. national weather service was founded as a [illegible] Signal Service. The first hurricane ever seen on [illegible] the Signal Service map of September 28, [illegible] waters between Savannah, Ga., and [illegible]

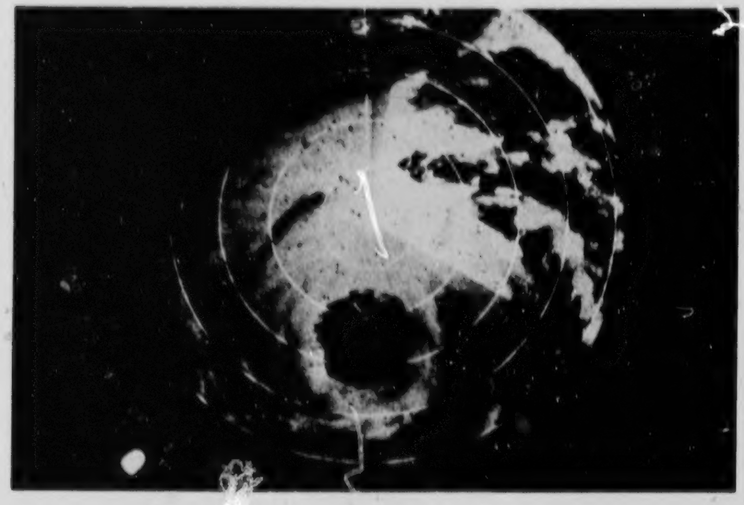
[illegible]. Weather Bureau was organized, taking over [illegible] of the Signal Corps. In 1902 Marconi invented the wireless, and at last, hurricane warnings were no longer dependent on telegraph wires or on cables stretched across the ocean's floor. Now instantaneous reports from far-off islands or lonely ships could give early warning . . . the modern age of hurricane warnings had begun.

Colonel Joseph P. Duckworth, a pioneer in instrument flight, together with Lieutenant Ralph O'Hair as navigator, made the first intentional aircraft penetration of a hurricane in 1943. Duckworth brought a light, single-engined plane through the maelstrom of wind and water that was a Galveston-bound hurricane into the very eye itself, that eerie canyon of clouds and stillness hidden deep in the heart of every hurricane.



Navy Lt. Judy Neuffer, the first woman to pilot a plane through the eye of a hurricane (September 1, 1974).

A hurricane eye seen on radar.



For his courage and initiative, Colonel Duckworth received the Air Medal. His flight opened the door to a whole new era in hurricane tracking and forecasting. Today, reconnaisance aircraft fly many missions during every hurricane season, tracking and analyzing storms still days away from the nearest land station. This vital, but now routine service, owes its existence to Duckworth's faith in his ability to fly safely in any kind of weather.

More recently, new tools have been given the hurricane forecaster. Among these are radar and the weather satellite. Nowadays, few hurricanes roar in unheralded on helpless people. They are kept under constant surveillance from the moment of their discovery, often far out at sea. Except for the crew of some unlucky ship, the people of some isolated island, there is time to prepare . . . to get out of the way. Today, it is not hurricane forecasting, but hurricane control that is more often the topic of conversation.

It used to be popularly suggested that battleships could shell a hurricane and destroy it. More recently, atomic and hydrogen bombs have been discussed. What is not realized is the enormous energy involved in these storms. In 24 hours, the average hurricane releases the energy equivalent of 500,000 atom bombs of the Nagasaki type. Hydrogen bombs are far more powerful than atomic bombs, but even they fall far short of the energy released by such a storm. Yet a hurricane operates at only about 3 percent efficiency in releasing its energy.

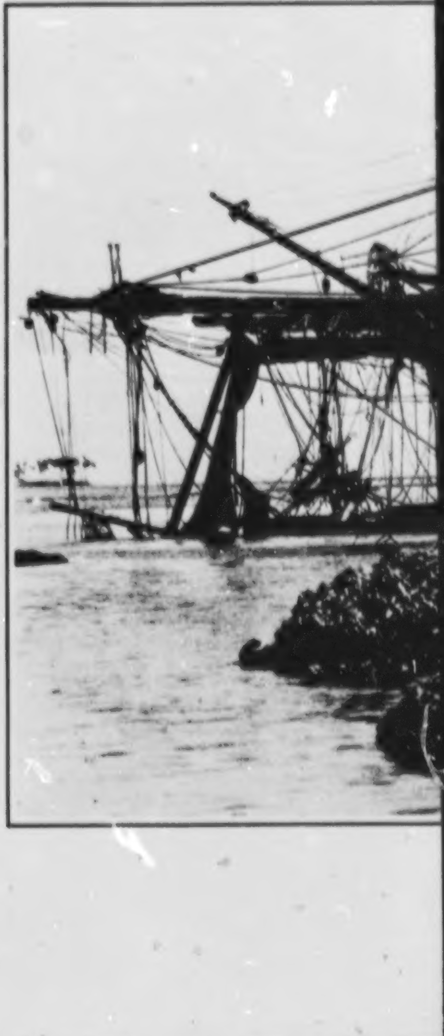
Even if it were possible, the destruction of hurricanes might create more problems than it would solve. The hurricane may be essential in preserving the heat balance of the atmosphere. If it is, and man interferes, no one can predict the consequences.

Hurricanes definitely have their place in the scheme of things. Down through the centuries they have helped shape the very environment in which we live. As we have seen, they have frequented our history, and at times have changed its course. There was even a hurricane that kept the United States out of war.

HURRICANES HAUNT OUR HISTORY

In 1888 Prince Bismarck, the Chancellor of Germany, tried to establish a German protectorate in Samoa. German naval vessels, while shelling a native village, destroyed some American property, and German sailors ripped down and burned an American flag. U.S. warships sped to Samoa. On March 16, 1889, as the ships of the two nations faced each other in the harbor of Apia, a savage hurricane overwhelmed them. The ships were either sunk, or wrecked and driven aground. The seamen of both nations struggled to survive . . .

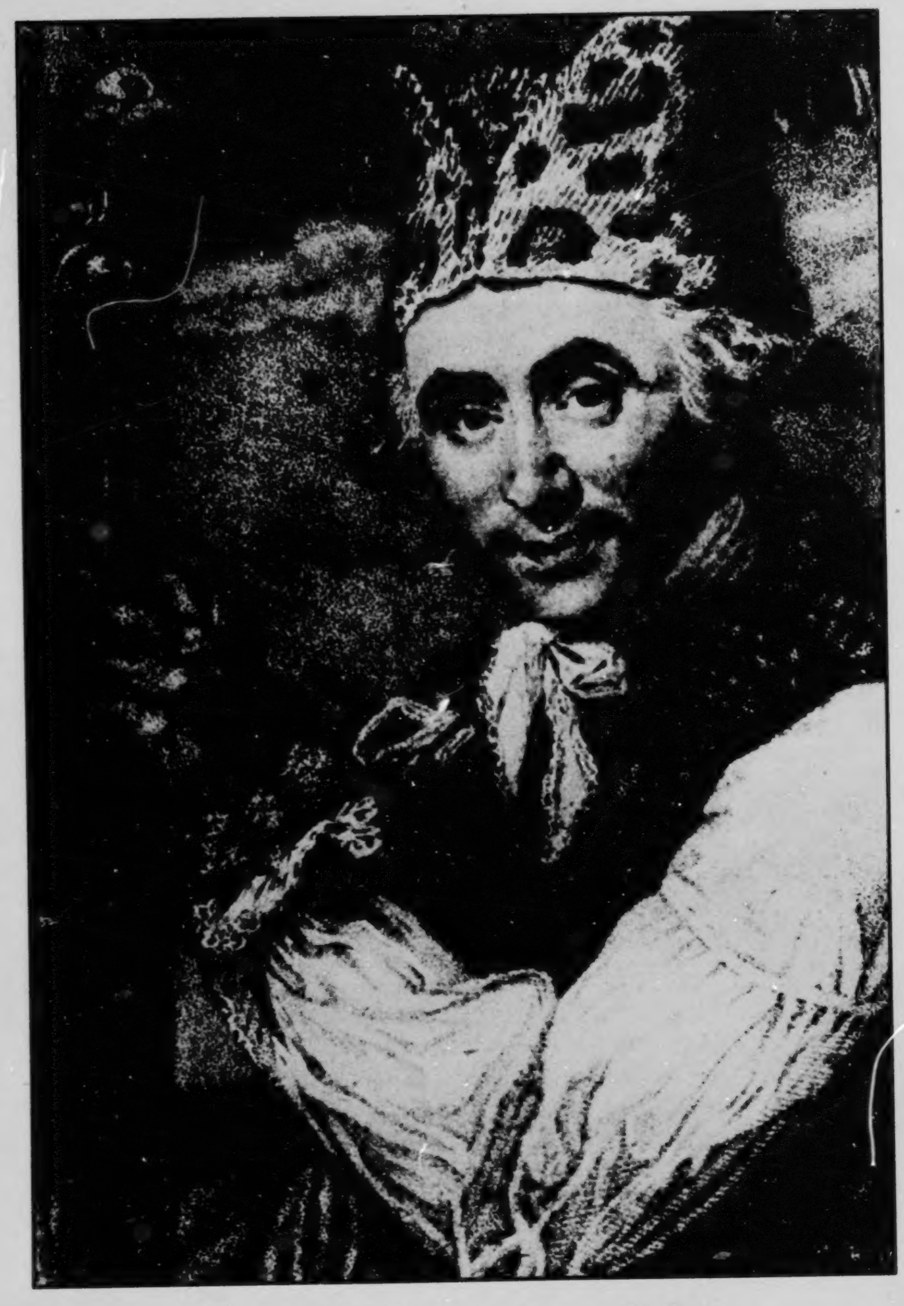
Prince Bismarck,
the Iron Chancellor.



and to help one another. The island's natives came to the rescue of both. Even so, about 150 sailors drowned. It was a high price to pay, but the hurricane brought peace. In a time of mutual disaster, grievances were forgotten and differences soon resolved in the Treaty of Berlin of 1889.

The hurricane had prevented war. A worthy addition indeed to that long line of hurricanes that have whirled through the lives of the American People from the very beginning. ■

The wreck of the German Man-of-War Adler.

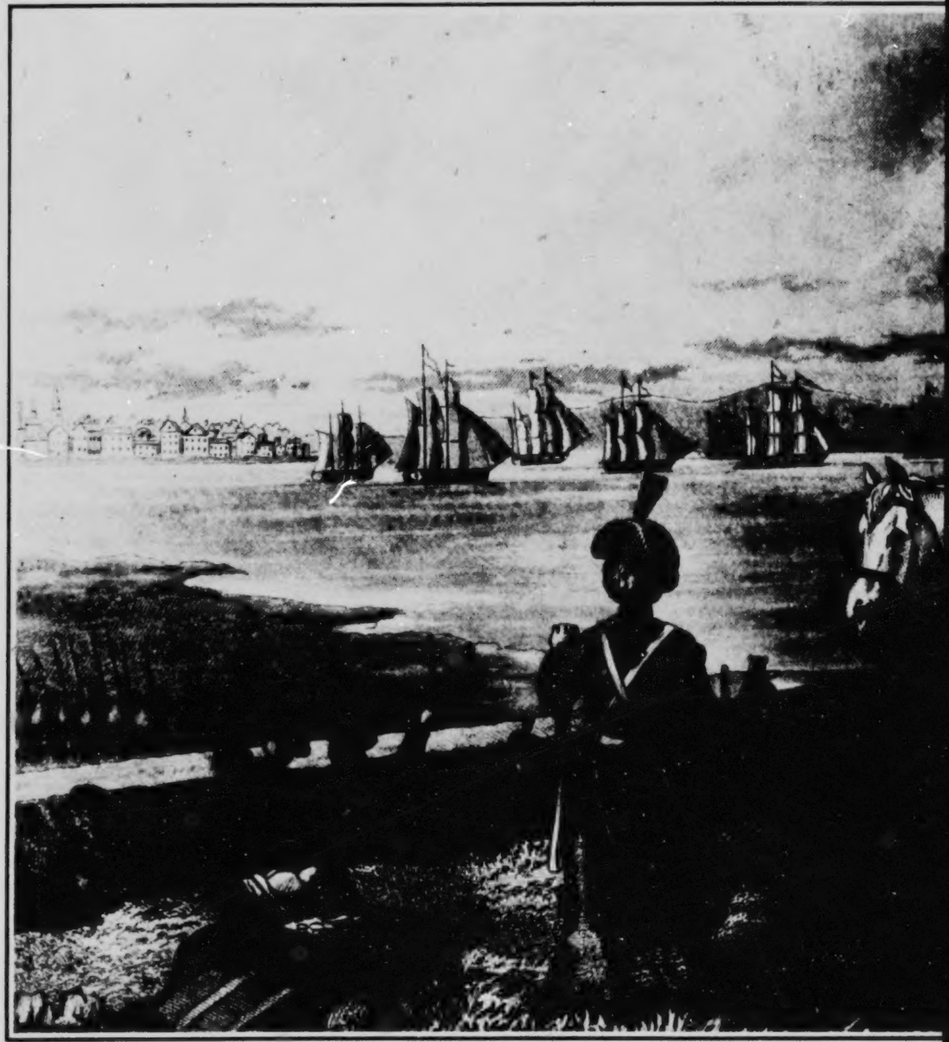


Dr. John Jeffries—physician, weatherman, and balloonist.

Early American Weathermen

The American Revolution interrupted John Jeffries weather journal.

During the winter of 1775-76, General George Washington laid siege to Boston. The British Army evacuated the city in March, and Dr. Jeffries, a Loyalist, went with them.

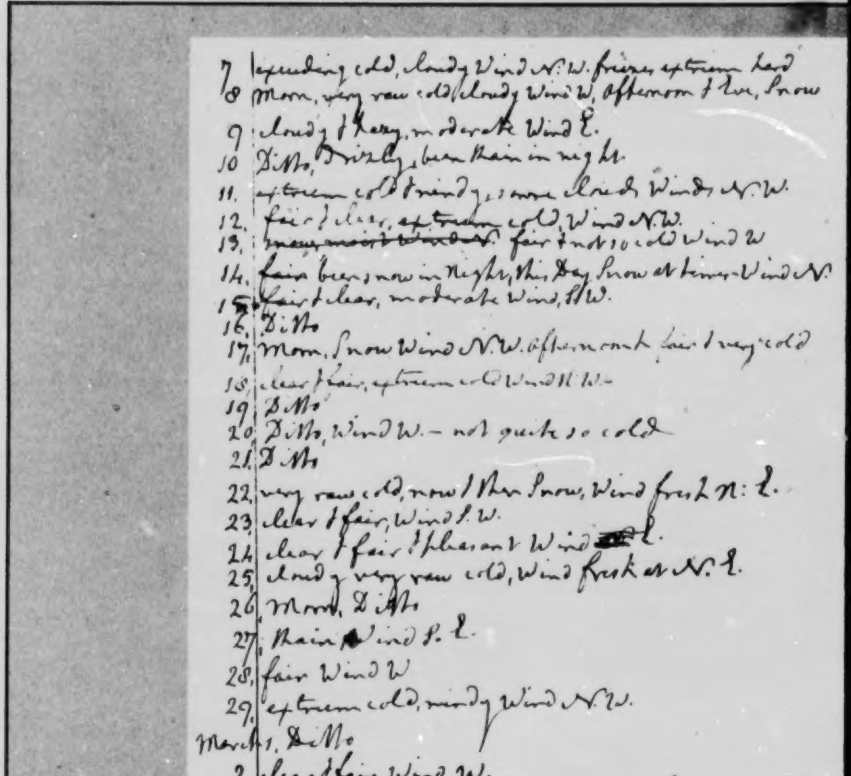


George Washington watches the British evacuate Boston, March 17, 1776.

John Jeffries was a Boston physician who recorded two series of notes on that city's weather between 1774 and 1816. He made daily entries from December 15, 1774, through March 4, 1776, then resumed his weather observations upon his return to Boston in 1790.

The second series is an intermittent record of daily observations from May 27, 1790, through September 19, 1816, prefaced by a summary of the winter of 1790.

Long before there was a U.S. weather service, and before the first American weather observer network was established by the Army's Medical Department in 1814, citizen scientists and students of nature were recording the weather and climate of our country. These included such giants of American history as Thomas Jefferson and George Washington, as well as hundreds of other, less famous Ameri-

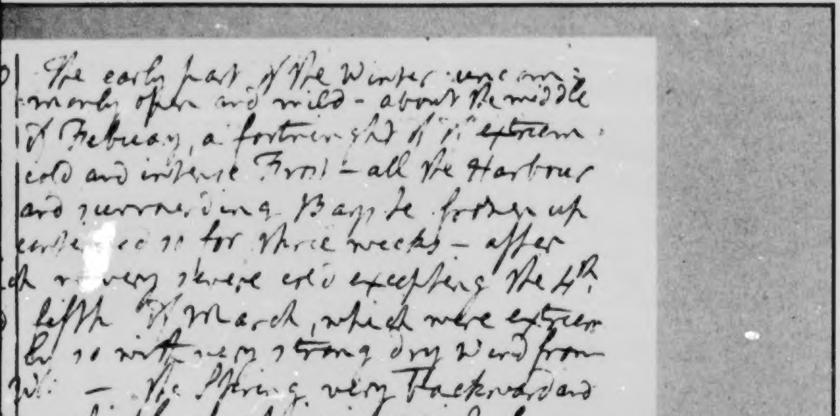


7 exceeding cold, cloudy Wind N: W. freezes extream hard
8 Morn, very raw cold & cloudy Wind W, Afternoon & Eve, Snow
9 cloudy & hazy, moderate Wind E.
10 Ditto, Drizly, been Rain in night.
11. extream cold & windy, some clouds Winds N.W.
12. fair & clear, extream cold, Wind N.W.
13. [illegible] fair & not so cold Wind W
14. fair been snow in Night, this Day Snow at times-Wind N.
15. fair & clear, moderate Wind, SW.
16. Ditto
17. Morn. Snow Wind N.W. afternoon fair & very cold
18, clear & fair, extream cold Wind N.W.-
19 Ditto
20 Ditto, Wind W.- not quite so cold
21. Ditto
22, very raw cold, now & then Snow, Wind fresh N: E.
23 clear & fair, Wind S. W.
24 clear & fair & pleasant Wind E.
25, cloudy very raw cold, Wind fresh at N. E.
26, Morn. Ditto
27, Rain Wind S. E.
28, fair Wind W
29, extream cold, windy Wind N.W.
March 1. Ditto
2 clear & fair, Wind W.
3 Ditto, Wind N.W. Afternoon Wind E
4 Ditto, Wind S. E.

John Jeffries' Boston weather diary.

cans. Collectively, their records constitute our principal source of information concerning the weather and climate of the United States from colonial days through the War of 1812.

John Jeffries was extraordinary, even in an age of exceptionally gifted men. After the evacuation of Boston, he served as a surgeon with the British Army in America. Then, when Cornwallis surrendered, he left to live in England, where he soon became interested in levitation or aerostation—the brand-new art of operating a manned balloon.



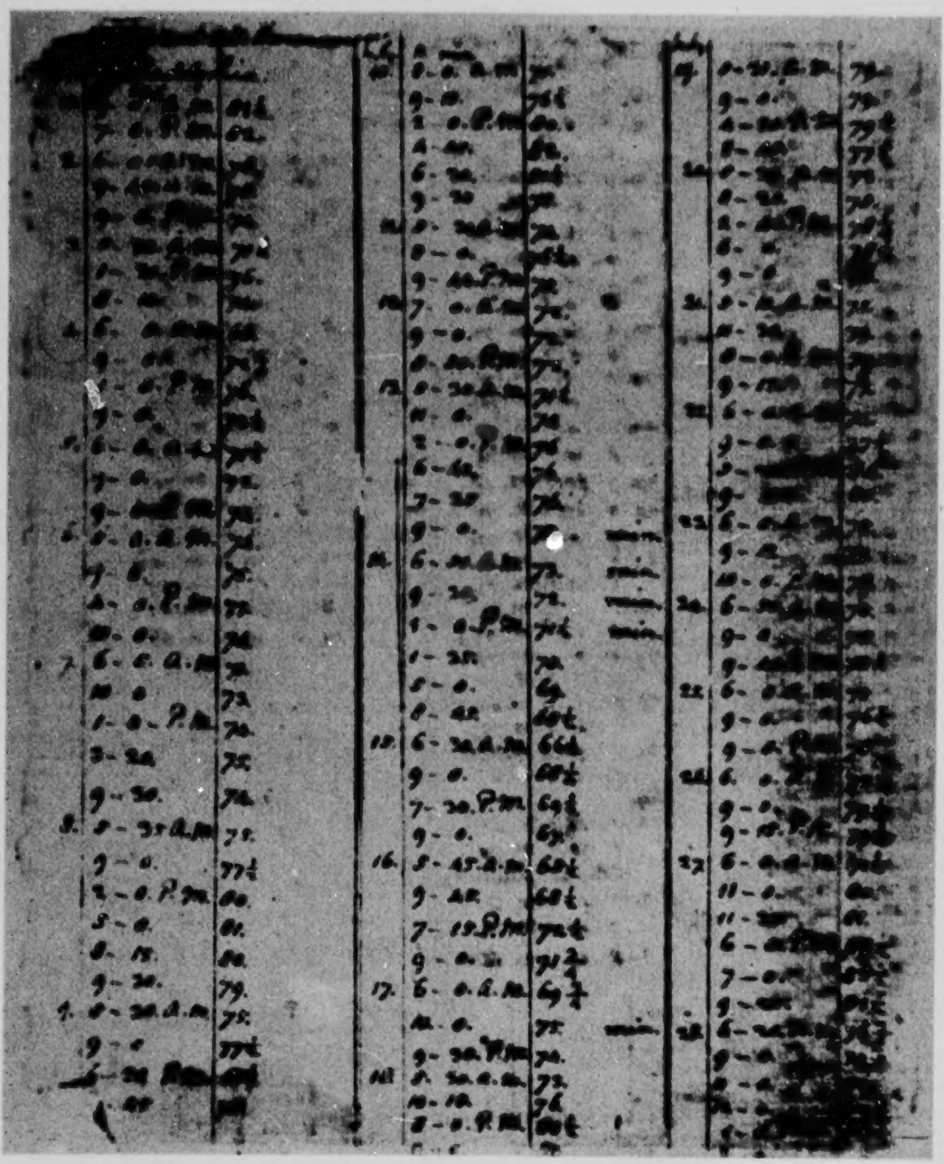
The early part of the Winter was re-
markably open and mild - about the middle
of February, a fortnight of ye extreme
cold and intense Frost - all the Harbour
and surrounding Bays be frozen up
[illegible] so for three weeks - after
ch no very severe cold excepting the 4th
fifth of March, which were extreme-
ly so with very strong dry Wind from
W: - the Spring very backward and
- chiefly owing to piercing Winds from
E: & E: prevailing -
During the Winter much less Snow
usual - and no strong violent cold
Storm from the N: E: - all the be=
ning Snow falls, degenerated into
ain -
cond Week in May, Peach & Plumb
es, in Blossom and continued in bloom
[illegible] 10 Days, or a fortnight -
last Week in May, apple Trees in
Blossom - and Lilacks flowering -

American Weather and the Founding Fathers

Benjamin Franklin (see page 12) and Thomas Jefferson loom large in the history of American weather science, while the last entry in George Washington's weather diary was made the day before he died.

Thomas Jefferson studied the Nation's climate, collecting weather records from as far west as the Mississippi River. He bought his first thermometer while writing the Declaration of Independence and his first barometer a few days after the document was signed. Jefferson made regular weather observations at Monticello from 1772 to 1778, and for much of the last 2 years he and the president of William and Mary College in Williamsburg took the first known simultaneous weather observations in America.

Like George Washington, Jefferson took weather observations well into his final illness. The last entry in his *Weather Memorandum Book* was made on June 29, 1826, six days before his death.



Thomas Jefferson's weather observations for Philadelphia, July 1776.

December 1799

8th. Morning perfectly clear, calm and pleasant; but about 9 o'clock the wind came from the No. Wt. and blew fresh. Mer. 38 in the morning.—and 40 at Night

9. Morning clear & pleasant, with a light Wind from No. W. Mer. at 33.—Pleasant all day—afternoon Calm Mer. 39 at Night.—Mr. Howell Lewis & wife set off for their home after breakfast—and Mr. Law Lewis and Washington Custis on a journey to N. Kent

10 Morning clear & calm—Mer. at 31 afternoon Lowering—Mer. at 42 and wind brisk from the Southward—A very large hoar frost this morng.

11. But little wind and Raining—Mer. 44 in the Morning and 38 at Night.—About 9 o'clock the Wind shifted to No. W. & it ceased Raining but contd. Cloudy.—Lord Fairfax, his son Thos. and daughter—Mrs. Warner Washington & son Whiting—and Mr. Jno. Herbert dined here & returned after dinner.—

12 Morning Cloudy—Wind at No. E. & Mer. 33.—A large circle round the Moon last Night—About 1 o'clock it began to snow—soon after to Hail and then turned to a settled cold Rain—Mer. 28 at Night.

13. Morning snowing & abt. 3 Inches deep—Wind at No. Et. & Mer. at 30, contg. snowing till 1 o'clock—and abt. 4 it became perfectly clear—wind in the same place but not hard—Mer. 28 at Night.—

Jeffries flew with the French aeronaut, Francois Blanchard. Together, they made the first scientific measurement of the free air over London on November 30, 1784. The crowd watching included the Prince of Wales and the Duchess of Devonshire, among other notables.

On this ascent, the balloonists measured pressure, temperature, humidity, electrical potential, and the chemical constituents of the air to a height of 6,560 feet. The values they obtained agree closely with those of today's observations.

Jeffries and Blanchard also were the first men to make an international voyage by air, crossing the English Channel from Dover to the forest of Guines, France, on January 7, 1785. Celebrated as heroes (a monument was erected in their honor near Calais), they reached Paris on January 11, where Jeffries dined with Benjamin Franklin, the American Ambassador to France and himself a pioneer weather scientist.

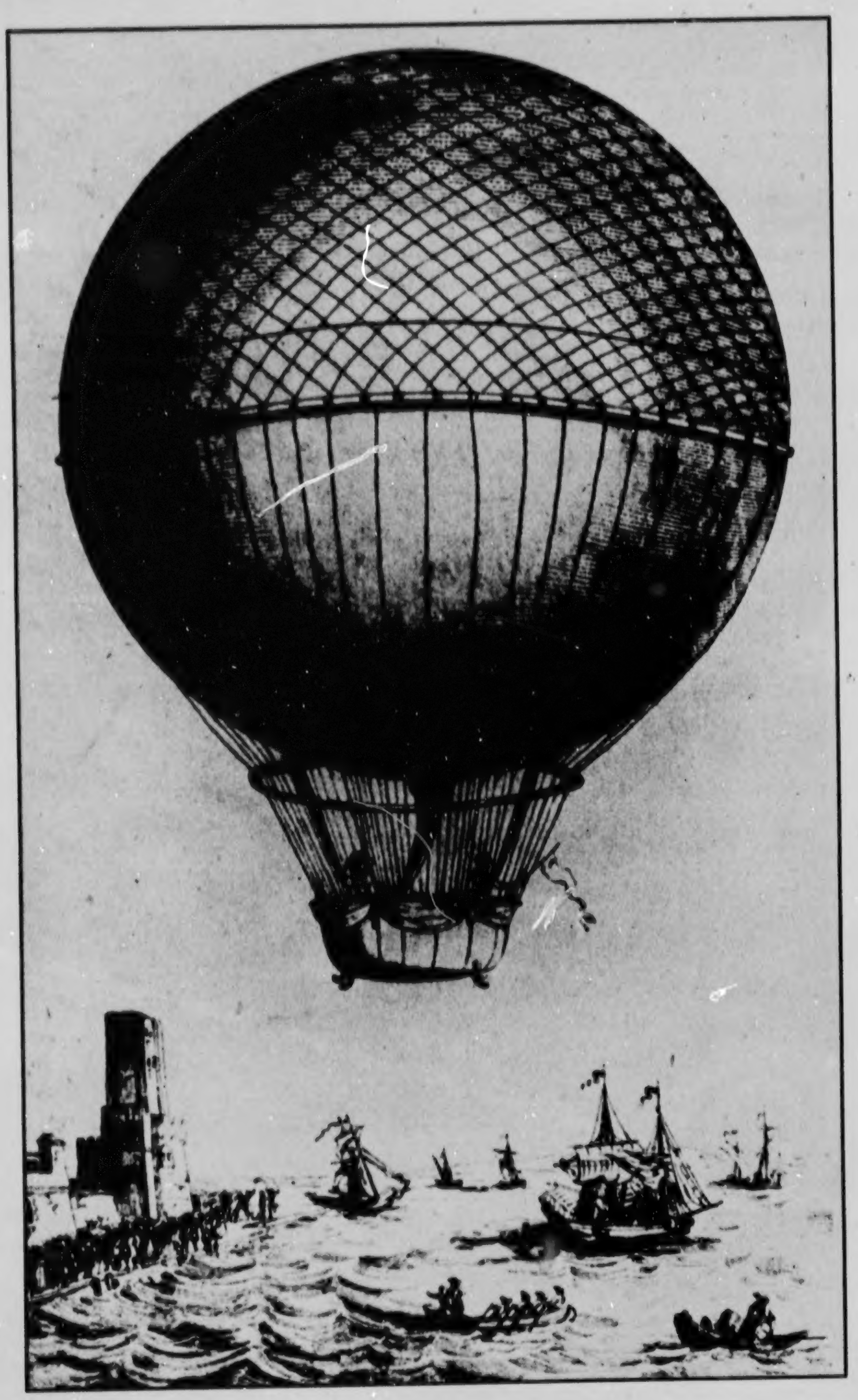
Jeffries returned to Boston in 1789, where he gave the first public lecture in New England on anatomy and, in 1790, resumed his weather diary.

John Winthrop was another early American weather observer active during the Revolution. A descendant of the first Governor of Massachusetts, Winthrop was a personal friend and adviser of George Washington and Benjamin Franklin and one of the Colonies' leading scientists and scholars.

In 1738, when only 24, Winthrop was elected professor of mathematics and natural philosophy at Harvard. He was America's first astronomer, as well as a physicist and mathematician. He established the first laboratory of experimental physics in America in 1746, and in 1751 introduced "the elements of fluxions"—now known as differential and integral calculus—into the Harvard curriculum.

Winthrop, a patron of Benjamin Franklin's lightning experiments, was also a student of atmospheric phenomena. He kept a daily record of the weather at Harvard from December 1742 until his death on May 3, 1779, during the fourth year of the Revolution.

The last page of George Washington's weather diary.
The final entry was made the day before he died.



In 1959, Harvard University's Blue Hill Observatory donated its collection of original 18th and early 19th century weather diaries and journals to the National Climatic Center in Asheville, N.C. These journals include John Jeffries' observations and come largely from the New England area. One of the more interesting was kept by William Plumer of New Hampshire.

Plumer, a teenager when the Revolution began, was born at Newburyport, Mass., on June 25, 1759, and moved to a farm in Epping, N.H., in 1768. He served in the New Hampshire legislature intermittently between 1785 and 1800, and was Speaker of the House in 1791 and 1797. During this period, he drafted major revisions to the State's constitution, creating the form of government under which New Hampshire still operates.

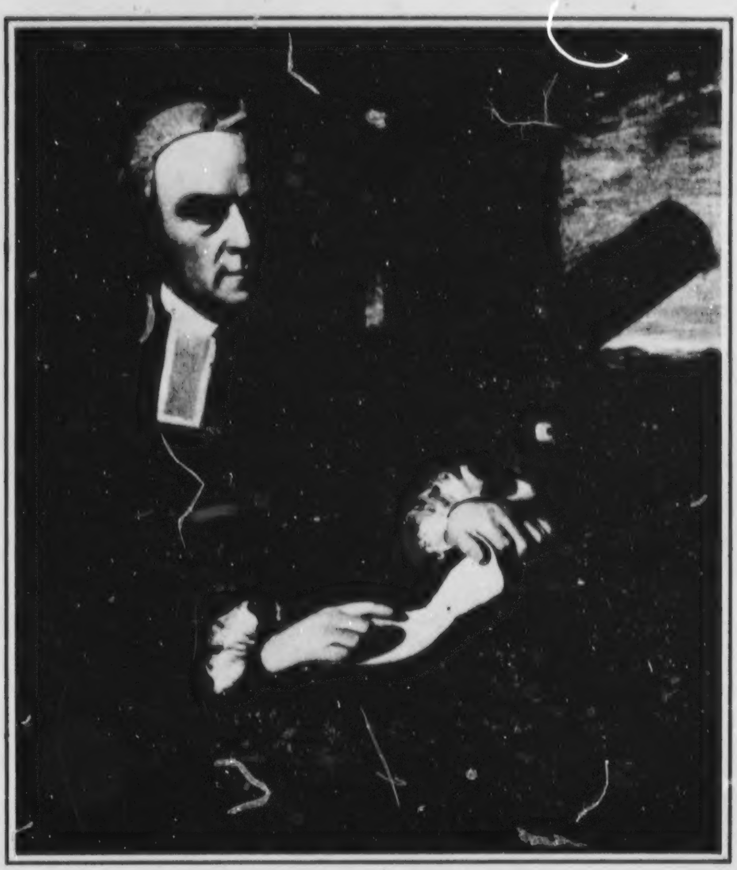
From 1802 to 1807, Plumer served in the United States Senate, then declined to stand for reelection, preferring instead to return to the New Hampshire legislature. After serving as President of the State Senate in 1810 and 1811, he was elected governor the following year. During the War of 1812, Plumer was the only New England governor who actively supported the national government. A candidate for governor in the 3 succeeding years, he was defeated by narrow margins in bitter campaigns. When peace came, however, he was reelected and served from 1816 to 1819.

William Plumer recorded daily weather conditions during most of the period 1796 through 1823. His observations were made at his home in Epping, in Washington, D.C., while he was a U.S. Senator, and at Concord, during his years as governor.

Following his retirement from public life, Plumer began a writing career, and is credited with more than 1,900 articles and sketches of American biography. He died in his childhood home in Epping on December 22, 1850, at the age of 91.

Like Plumer, Samuel Rodman, Jr., took weather observations during the War of 1812. A leading merchant and manufacturer of New Bedford, Mass., Rodman was also a member of the Society of

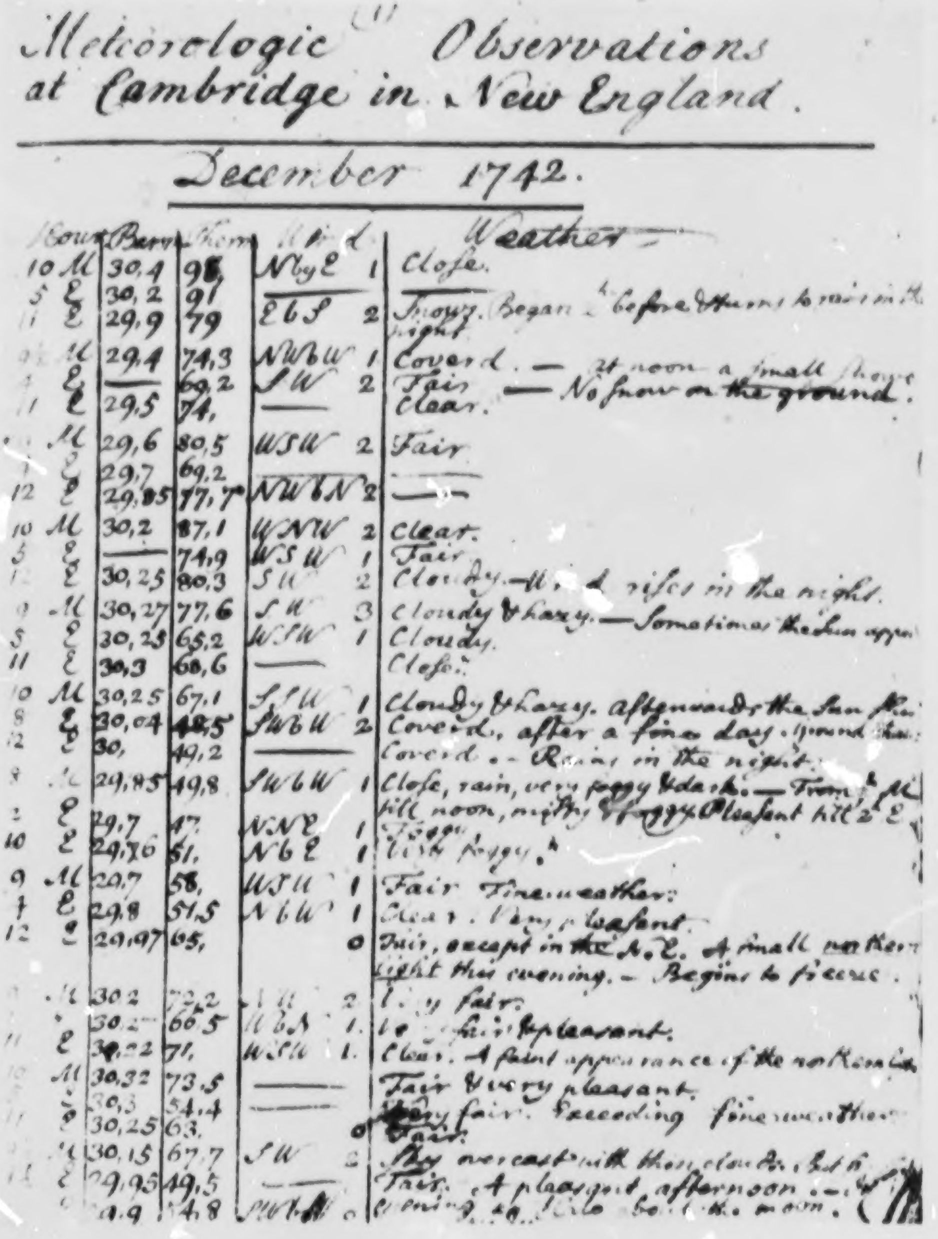
Jeffries and Blanchard
crossing the English Channel in 1785.



John Winthrop, about 1773.
Right: The first page of John Winthrop's Harvard weather diary.

Friends, an antislavery advocate, and a leader in local charities. He began a daily weather journal in New Bedford in 1812, when he was 20, and continued it until his death in 1876, when his son Thomas took over his meteorological observations.

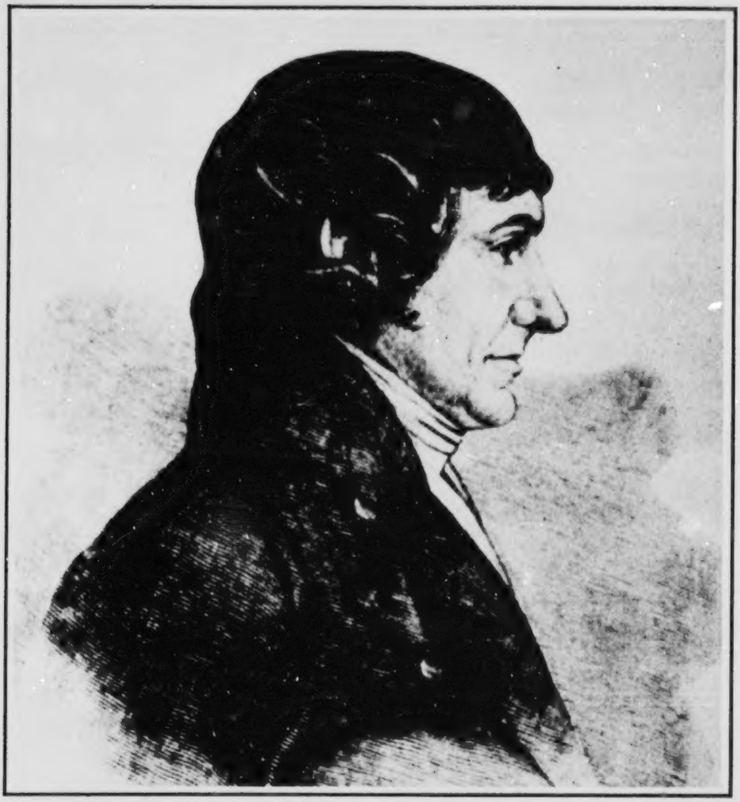
In 1889 Adolphus W. Greeley, Chief of the Signal Corps' national weather service, wrote to Thomas Rodman that for continuity



Meteorologic^{al} Observations at Cambridge in New England.

December 1742.

Hour		Barom	Therm	Wind		Weather
10	M	30,4	98,	N by E	1	Cloſe.
5	E	30,2	91	—		—
11	E	29,9	79	E b S	2	Snowy. Began [illegible] before [illegible] to rain in the night.
9½	M	29,4	74,3	NWbW	1	Cover'd. — At noon a ſmall ſhowr
4	E	—	69,2	SW	2	Fair — No ſnow on the ground.
11	E	29,5	74,	—		Clear.
[illegible]	M	29,6	80,5	WSW	2	Fair
[illegible]	E	29,7	69,2	—		—
12	E	29,85	77,7	NW b N	2	—
10	M	30,2	87,1	WNW	2	Clear.
5	E	—	74,9	WSW	1	Fair
12	E	30,25	80,3	SW	2	Cloudy. — Wind riſes in the night.
9	M	30,27	77,6	SW	3	Cloudy & hazy. — Sometimes the Sun appe
5	E	30,25	65,2	WSW	1	Cloudy.
11	E	30,3	68,6	—		Cloſe.
10	M	30,25	67,1	SSW	1	Cloudy & hazy. Afterwards the Sun ſhi
8	E	30,04	48,5	SWbW	2	Cover'd, after a fine day. Ground tha
12	E	30,	49,2	—		Cover'd. — Rains in the night.
8	M	29,85	49,8	SWbW	1	Cloſe, rain, very foggy & dark. — From 8h M till noon, miſty & foggy. Pleaſant till 2h E
2	E	29,7	47,	WNE	1	Foggy.
10	E	29,76	51,	N b E	1	[illegible] foggy.
9	M	29,7	58,	WSW	1	Fair. Fine weather.
4	E	29,8	51,5	N b W	1	Clear. Very pleaſant.
12	E	29,97	65,		0	Fair, except in the N.E. A ſmall northern light this evening. — Begins to freeze.
[illegible]	M	30,2	72,2	[illegible]	2	Very fair.
[illegible]	[illegible]	30,2	66,5	W b N	1.	Very fair & pleaſant.
11	E	30,22	71,	WSW	1.	Clear. A faint appearance of the northern light.
10	M	30,32	73,5	—		Fair & very pleaſant.
5	E	30,3	54,4	—		Very fair. Exceeding fine weather.
11	E	30,25	63,		0	Fair.
9	M	30,15	67,7	SW	2	Sky overcaſt with thin clouds. [illegible]
[illegible]	E	29,95	49,5	—		Fair. A pleaſant afternoon. — [illegible]
[illegible]		29,9	54,8	NWbW	0	Evening [illegible] Circle about the moon. (



William Plumer, 1804.

Right: William Plumer's weather observations for Concord and Epping, N.H., July 1–12, 1816.

and homogeneity, his father's rainfall record was "the most remarkable record in this country, and perhaps in the world." Later, in thanking Rodman for a copy of an unbroken record of mean temperature kept at New Bedford from 1813 to 1890 by both father and son, Greeley praised it as affording "an opportunity seldom presented for the study of the variations of our climate. . . ."

July 1816.

Monday 1 S.W. ~~44~~ 71. 52 Fair. At Concord.

Tuesday 2. S.W. 53, 80, 66 Fair. At Concord. Moon quartered 4h. 56 m.

Wednesday 3. S.E. 62, 77. 68. Fair. at Concord

Thursday 4 N.W. 60, 69, 62 Fair. At Concord.

Friday 5. S.W. 53. 77. 70 Fair From Concord to Epsom.

Saturday 6, N.W. high, 67. 76. 60 Fair. From Epsom to Epping.

Sunday 7. N.W. high 55, 64, 55 Fair.

Monday 8. N.W. high 48, 66, 55 Fair.

For several days the dust flew in the road like snow in winter & obscured the sight. The prospect for corn & hay is small. Corn is now selling at 2 dollars per bushel & very scarse. Cattle in the pasture will soon suffer for want of feed.

Tuesday 9. N.W. high 48, 65, 53. Fair.

A Spot in the sun visible in the morning, in the center large & black. Moon fulled 7h. 27m.

Wednesday 10. W. 50. 75, 66 Fair

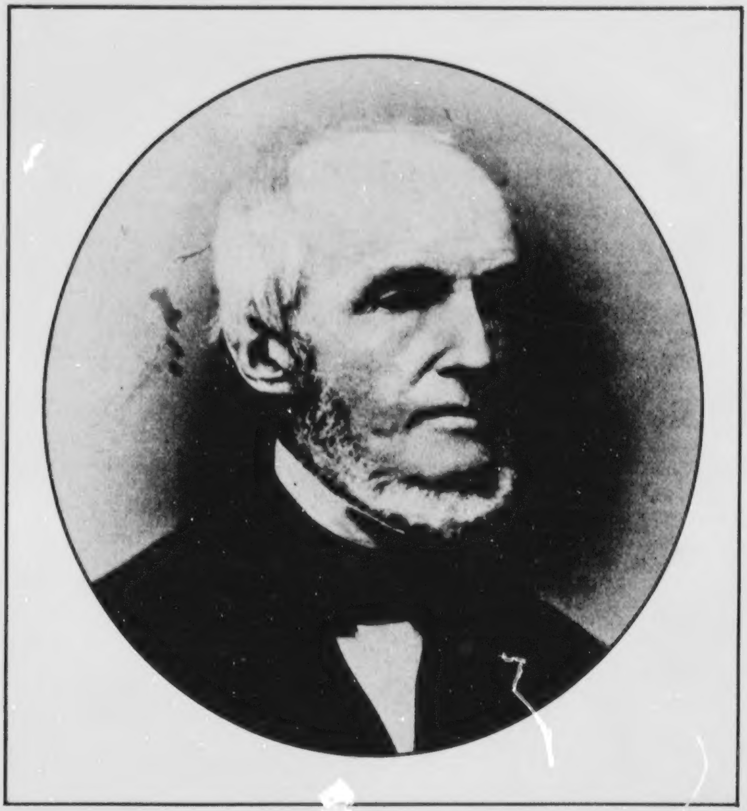
At 7 O Clock a.m. saw 2 spots in the sun near the west limb of it.

The earth is remarkably dry — grass drying up — corn low & small — the high wind from the N.W. have parched the earth. The prospect is gloomy — the crops must be small. The sun seldom appeared & the atmosphere smoky.

Thursday 11 S.W. 57, 81, 62 Fair.

Friday 12. S. 53, 76, 59 Fair

Saturday 13. N.E. 56, 70, 56 Fair.



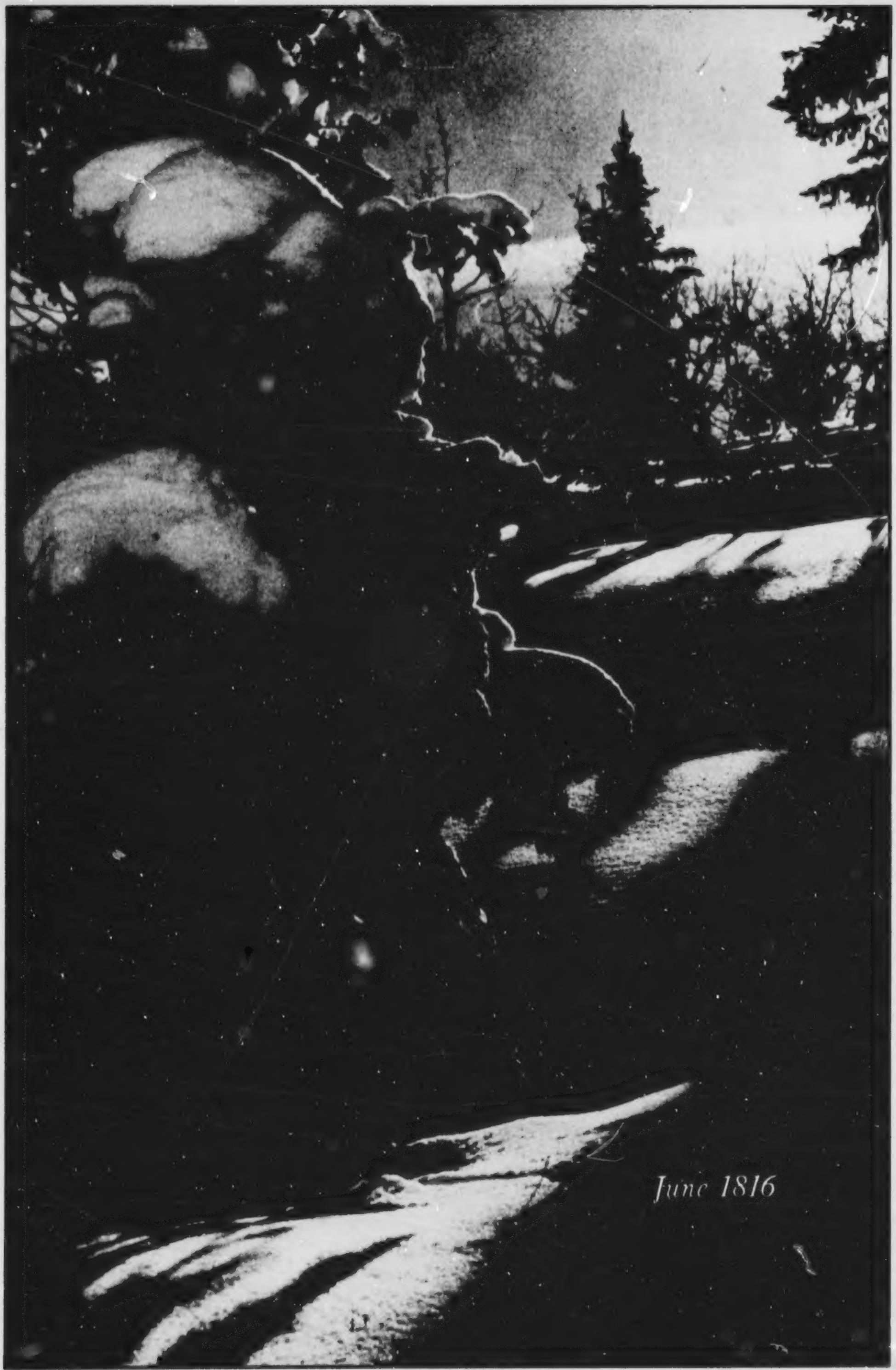
Samuel Rodman, Jr.

Right: A note (1812) concerning the Moon's effect on weather, from Rodman's weather diary for New Bedford, Mass.

As indicated by Greeley, the scientific evaluation of such climatic fluctuations depends upon the period of reliable record; the longer the period of record, the more meaningful the measurement of variations. In this regard, the weather journals of private citizens dating to the colonial period add significantly to our knowledge of the climate of our country. ■

N.B. The Moons age in this & the subsequent Journals is noted, not from any belief that the *Phases* of that Planet have any sensible influence upon our Atmosphere, but to furnish data by which to disprove the opinion generally prevalent with practical Men upon that Subject: & which lead them when forming their judgments in anticipation, of the Weather constantly to have reference to the Position of that Luminary in respect to us and the Sun. — S. Rodman Jr

11 mo: 181[illegible]



June 1816

The Year Without a Summer

This past summer and fall have been so cold and miserable that I have from despair kept no account of the weather.

—Adino Brackett, 1816

The year 1816 is legendary in the annals of weather. It has been called "the year without a summer," "poverty year," and "eighteen hundred and froze-to-death."

From May through September, an unprecedented series of cold spells chilled the northeastern United States and adjoining Canadian provinces, causing a backward spring, a cold summer, and an early fall. There was heavy snow in June and frost even in July and August. All across the Northeast, farmers' crops were repeatedly killed by the cold, raising the specter of widespread famine.

The amazing weather of 1816 is well documented in the diaries and memoirs of those who endured it. Benjamin Harrison, a farmer in Bennington, Vt., termed it "the most gloomy and extraordinary weather ever seen." Chauncey Jerome of Plymouth, Conn., writing in 1860, recalled:

> *I well remember the 7th of June . . . dressed throughout with thick woolen clothes and an overcoat on. My hands got so cold that I was obliged to lay down my tools and put on a pair of mittens . . . On the 10 of June, my wife brought in some clothes that had been spread on the ground the night before, which were frozen stiff as in winter. On the 4th of July I saw several men pitching quoits in the middle of the day with thick overcoats on, and the sun shining bright at the time.*

Since relatively few settlers had yet crossed the Mississippi, most of our weather observations for 1816 come from the eastern United States, particularly the Northeast, where there was a tradition of weather watching. The best observations available were made at Williamstown, in the northwestern corner of Massachusetts.

April and May 1816 were both cold months over the Northeast, with frost retarding spring planting. Flowers were late in blooming, and many fruit trees did not blossom until the end of May—only to have their budding leaves and blossoms killed by a hard frost which also destroyed corn and some other plants.

Warm weather finally came to all parts of the Northeast during the first few days of June. Farmers forgot the frosts of May and began replanting their crops. But even as they labored, a cold front was approaching that would bring disaster.

Following the frontal passage, temperatures tumbled dramatically under the onslaught of Arctic air. At noon on June 5, the temperature at Williamstown was 83 degrees. By 7 a.m. on the 6th, it had dropped to 45 degrees—the highest temperature recorded for the day. All across central New England, early morning temperatures were the highest recorded for the day.

From June 6 to 9, severe frost occurred every night from Canada to Virginia. Ice was reported near Philadelphia, and "every green herb was killed, and vegetables of every description very much injured." In northern Vermont, the ice was an inch thick on standing water while elsewhere in the state "icicles were to be seen a foot long . . . corn and other vegetables were killed to the ground, and upon the high lands the leaves of the trees withered and fell off."

People shivered, dug out their winter clothing, and built roaring fires. Farmers watched helplessly as their budding fields and gardens blackened, and in northern towns newly shorn sheep, though sheltered, perished. Thousands of birds also froze to death, as did millions of the yellow cucumber bug.

The culmination of this remarkable cold wave came early on the 11th of June. At Williamstown the observer noted, "Heavy frost —vegetables killed—at 5 o'clock temperature 30.5 degrees." Overall, frost killed almost all the corn in New Engand, the main food staple, as well as most garden vegetables.

There were two snowfalls. The first, on the 6th, brought relatively light snow to the highlands of western and northern New York State and most of Vermont, New Hampshire, and Maine. The second occurred during the night of June 7-8, following the passage of a second cold front. It brought moderate to heavy snow to northern New England, with lighter snow and snow flurries extending eastward to the coast and southward through northern Massachusetts and New York State's Catskill Mountains.

THE YEAR WITHOUT A SUMMER

The following account appeared in the Danville, Vermont, *NORTH STAR*:

Melancholy Weather . . . On the night of the 7th and morning of the 8th a kind of sleet or exceeding cold snow fell, attended by high wind, and measured in places where it drifted 18 to 20 inches in depth. Saturday morning [8th] the weather was more severe than it generally is during the . . . winter. It was indeed a gloomy and tedious period

In Canada, Montreal had snow squalls on both the 6th and 8th of June, while 12 inches of snow accumulated near Quebec City from the 6th to the 10th, with some drifts "reaching to the axle trees of carriages."

This first summer cold spell was followed by 4 weeks of relatively good weather. Farmers again replanted, and crops were growing well when, at the end of the first week in July, a new cold outbreak came. Although not as severe as the one in June, it killed corn, beans, cucumbers, and squash in northern New England, and soon had local farmers talking about the threat of a general famine.

Once again, the remainder of the month was more seasonable, though there was another cool spell around the 18th. The hardier grains such as wheat and rye, however, came along well, and by August farmers were joking about their earlier "famine fever."

On August 20, another cold wave arrived, tumbling temperatures in New Hampshire some 30 degrees. During the next 2 days, frost was reported as far east as Portland, Maine, and as far south as East Windsor, Conn. Travelers between Albany, New York, and Boston reported most of the corn in low-lying areas destroyed.

A more severe frost came at the end of August. In Keene, N.H., it put an end to the hopes of many corn growers, and whole fields had to be cut up for fodder.

The first week of September was relatively warm, but around the 11th and 12th a cold outbreak again visited the Northeast, with hard frost reported in northern and central New England. It was the widespread and killing frost of September 27, however, which irrevocably closed out this dismal growing season and destroyed all hopes of even a small corn harvest in northern New England.

A Concord, N.H., paper reported: "Indian corn on which a large portion of the poor depend is cut off. It is believed that through New England scarcely a tenth part of the usual crop . . . will be gathered." In Montreal it was said that ". . . many parishes in Quebec must inevitably be in a state of famine before winter sets in." During the severe winter of 1816-17 which followed, the threat of starvation or semistarvation became a reality for many.

The first general migration from New England to the Middle West occurred the following year. Although there were other factors involved, it is interesting to note that the three northern States of Vermont, New Hampshire, and Maine, which bore the brunt of the cold weather, suffered the greatest exodus.

In summary, the chief weather abnormalities of 1816 were the series of totally unexpected cold spells that occurred continuously through the late spring, summer, and early fall—and, of course, the June snow.

New England temperatures averaged 3 to 6 degrees below normal in June and July, and 2 to 3 degrees below in August. May also had been below normal, as was the following September. It had been just as cold (or even colder) in each of these months in other years, but never consecutively. More significant, however, is the fact that, in 1816, the low temperatures occurred in a region where even a few degrees' difference in the minimum temperature can mean a severe frost.

Although the New England farmer considered it a local tragedy, the abnormal weather was widespread throughout the Northern Hemisphere. In England it was almost as cold as in the United States, and 1816 was a famine year there, as it was in France and Germany.

Actually, 1816 was just one of a famous series of cold years. From 1812 to 1817 it was cold over the whole world. In the United

The Cold Season

Extracts from History of Madison County, New-York, by Mrs. L. M. Hammond, Pub. 1872.

"Town of De Ruyter, Madison Co. N.Y.

"In 1816 came the 'cold season'. There was a frost in every month. The crops were cut off, and the meagre harvest of grain was nowhere near sufficient for the needs of the people. The whole of the newly settled interior of New-York was also suffering from the same cause. The inhabitants saw famine approaching. (The alarm and depression so wrought upon the feelings of the community, that a religious revival ensued.) What little grain there was that could be purchased at all, was held at remarkable prices, and this scant supply soon failed. Jonathan Bentley at one time paid two dollars for a bushel of corn, which, when ground, proved so poor that it was unfit for use; throwing it to his swine, they too refused the vile food. Every resource for sustenance was carefully husbanded; even forest berries and roots were preserved. The spring of 1817 developed the worst phases of want. In various sections of the county, families were brought to the very verge of starvation! One relates that he was obliged to dig up the potatoes he had planted, to furnish one meal a day to his famishing family; another states that his father's family lived for months without bread, save what was obtained in small crusts for his sick mother, and that milk was their chief sustenance. When the planting season arrived there was no seed grain in De Ruyter, so the inhabitants combined and sent Jeremiah Gage to Onondaga County to canvass for wheat and corn. He was absent several days, and the people, all alive to the importance of his mission, grew discouraged, fearing there was none to be found. At length he was seen approaching along the road where the head of the Reservoir now is, his wagon loaded, his hankerchief fastened to a pole and hoisted, fluttering in the breeze, a signal of joy and plenty. A crowd quickly gathered; there was great rejoicing and tears stood in strong men's eyes. Each family repaired to Gage's house to receive their quota of grain, and every household that day was glad."

States, the depression of summer temperatures was the most remarkable on record.

According to William Humphreys, a Weather Bureau scientist writing almost a century later, the cold years were caused largely by volcanic dust in the Earth's atmosphere. Such dust partially shields the Earth from the Sun's rays, but permits heat to escape from the Earth, thus lowering the temperature.

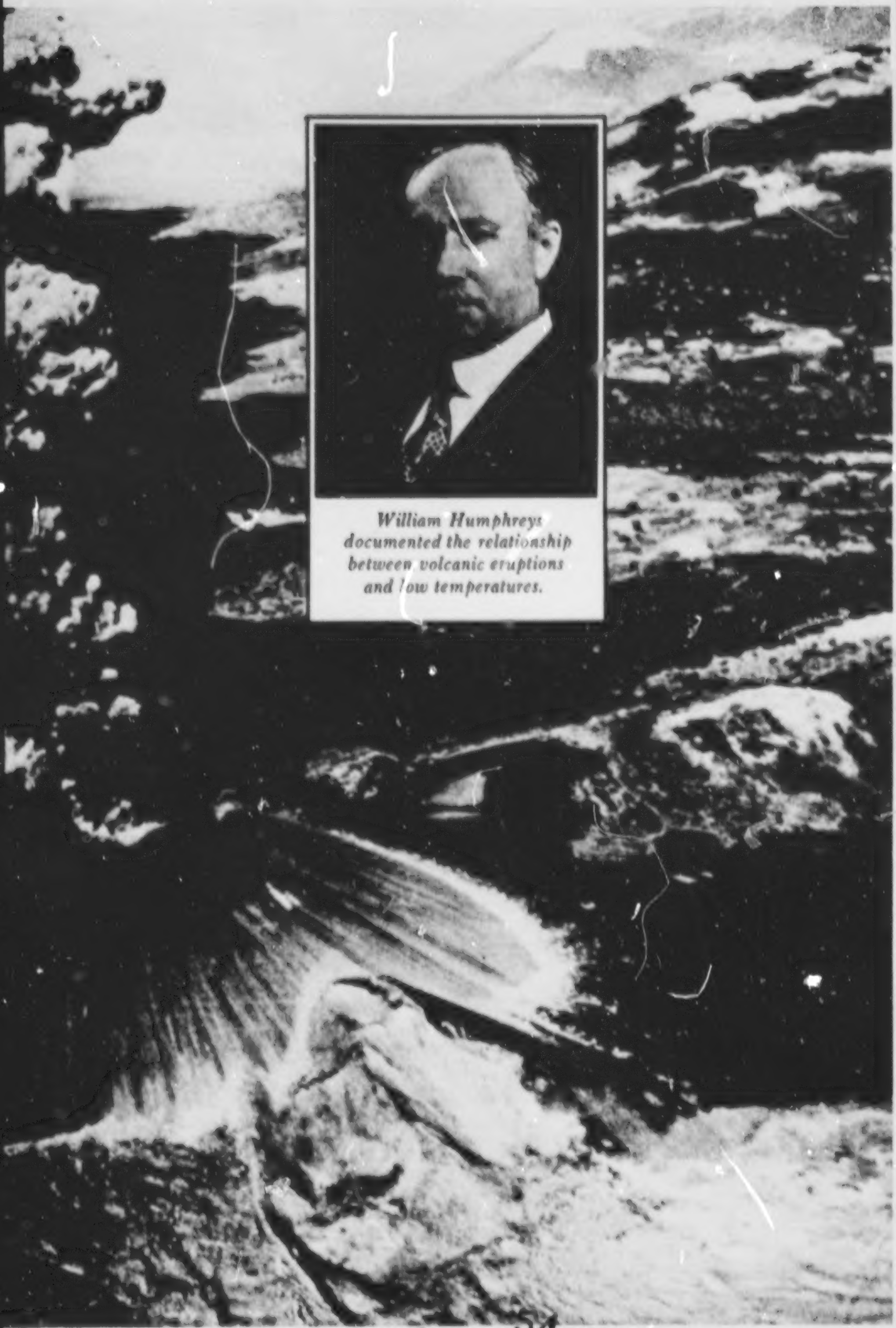
Three major volcanic eruptions took place between 1812 and 1817. Soufriere on St. Vincent Island erupted in 1812; Mayon in the Philippines in 1814; and Tambora on the island of Sumbawa in Indonesia in 1815. The worst was Tambora, a 13,000-foot volcano that belched flame and ashes from April 7 to 12, 1815, and rained stone fragments on surrounding villages.

It has been estimated that Tambora's titanic explosion blew from 37 to 100 cubic miles of dust, ashes, and cinders into the atmosphere, generating a globe-girdling veil of volcanic dust.

The idea that volcanic dust suspended in the atmosphere might lower the Earth's temperature has been around for a long time. Like many other scientific firsts, it can be traced to Benjamin Franklin, although the thought may not have been original with him. In 1913, William Humphreys published a now-classic paper documenting the correlation between historic volcanic eruptions and worldwide temperature depressions.

According to Humphreys, volcanic dust is some 30 times more effective in keeping the Sun's radiation out than in keeping the Earth's in. And once blown into the atmosphere—more specifically, the stratosphere—it may take years for the dust to settle out (the finest particles from Krakatoa's eruption in 1883, for example, took 2½ to 3 years to reach the ground). During this period, the average temperature of the whole world may drop a degree or two, while local losses can be considerably greater.

The chief effect, however, as in 1816, seems to be the dramatic depression of minimum temperatures during the summer.



William Humphreys documented the relationship between volcanic eruptions and low temperatures.

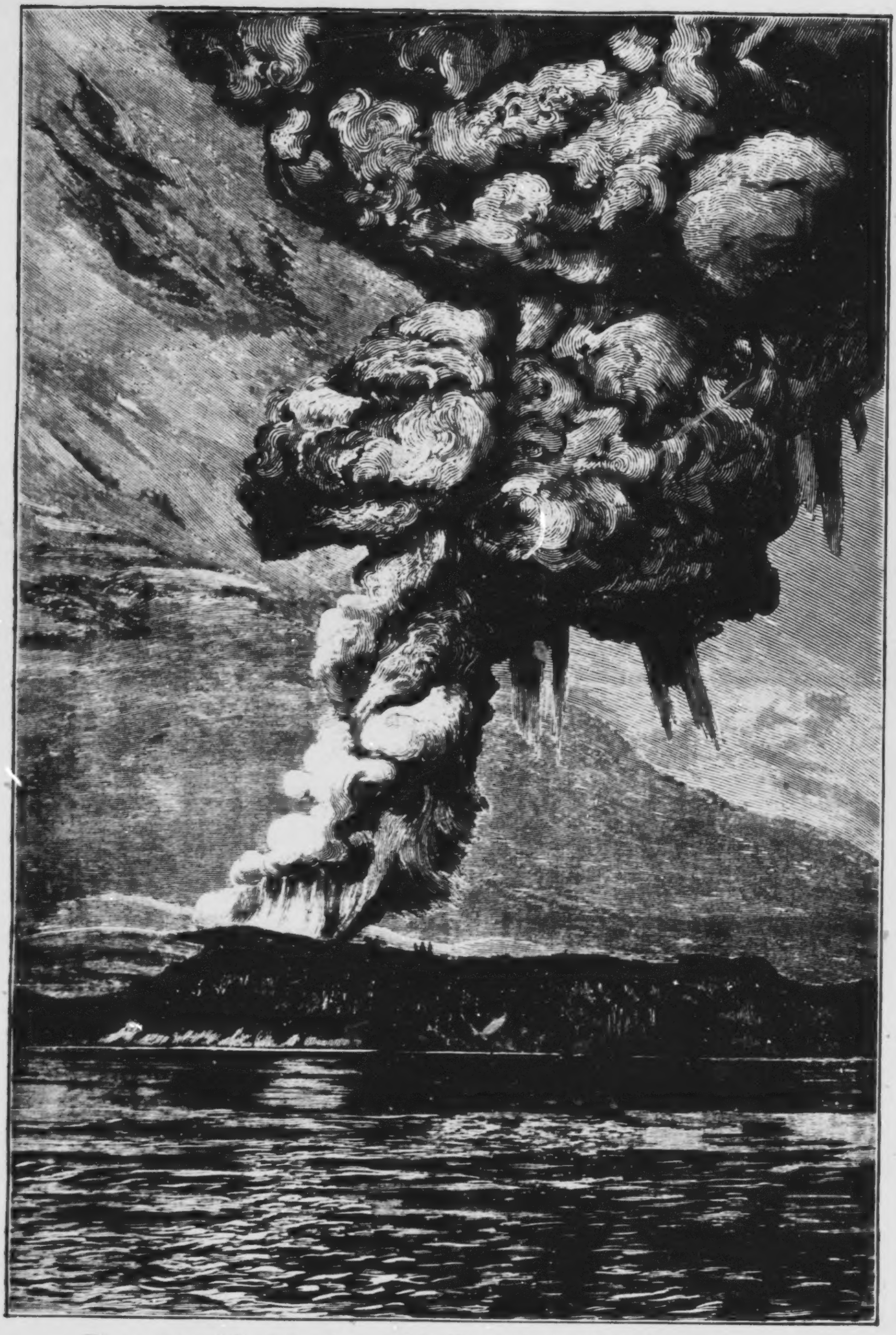
A weak sunspot maximum also preceded the cold summer of 1816. During May and June, these blemishes on the face of the Sun grew large enough to be seen with the naked eye, and people squinted at them through smoked glass.

In Humphreys' day, sunspots were thought to reduce the amount of solar radiation emitted and, during a period of maximum occurrence, to depress the Earth's average temperature by as much as a half degree. As a result, sunspots also were blamed for the trials of the New England farmer in 1816. Humphreys showed, however, that whatever the historic correlation between the Earth's average temperature and the occurrence of sunspot maximums, the most pronounced dips in the world temperature curve were, without exception, associated with violent volcanic eruptions that exploded great quantities of dust into the stratosphere.

An example is the famous cold year of 1785, which followed the frightful eruptions of Mount Asama in Japan and Skaptar Jokull in Iceland. These produced a widely observed "dry fog," the phenomenon that led Benjamin Franklin to suspect a relationship between cold weather and volcanic eruptions.

Volcanic dust is believed to have played a role—and perhaps a major one—in the great climatic changes of past ages. Even relatively small variations in the Earth's annual mean temperature can cause widespread changes in Arctic ice packs and world sea levels, in desert boundaries, and in the geographic limits of plant, animal, and human life. According to Humphreys, volcanic dust blown into the stratosphere once a year or even once every 2 years, would continuously maintain temperatures low enough to "cover the earth with a mantle of snow so extensive as to be self-perpetuating . . . and thereby initiate at least a cool period, or, under the most favorable conditions, even an ice age."

The New England farmer of 1816, of course, knew nothing of such theories; he knew only that something had gone wrong with the weather. And when that dreadful summer was followed by a winter so severe that the mercury froze in the thermometers, he must surely have thought the change was permanent. ■



The eruption of Krakatoa, August 1883. The explosion, heard 3,000 miles away, threw vast quantities of dust into the atmosphere, where it stayed for as long as 3 years.

View From a Civil War Cornfield

The Notes of Joseph T. Caldwell

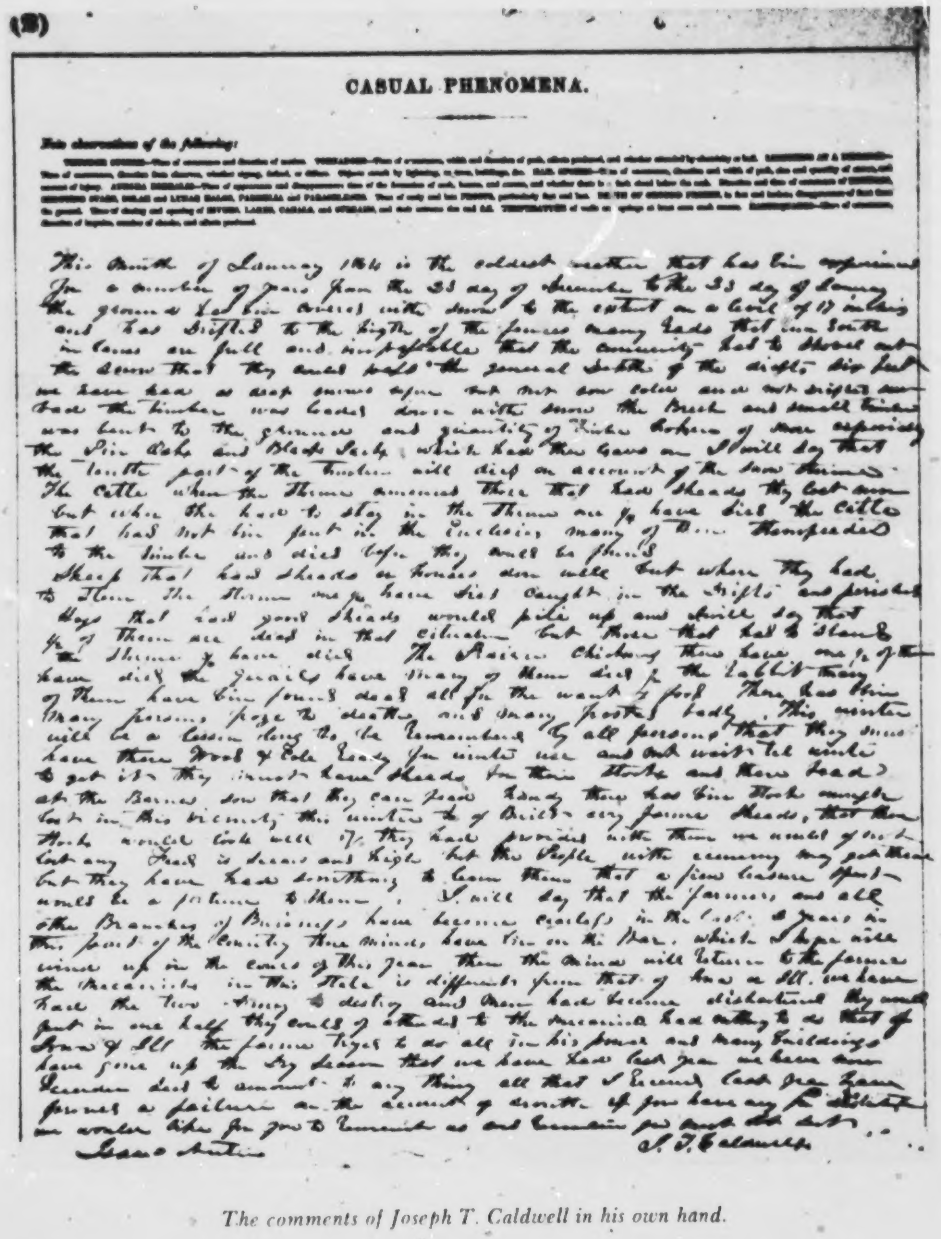
From January 1864 to July 1866, Joseph T. Caldwell, an Athens, Mo., farmer and a volunteer weather observer for the Smithsonian Institution, added lengthy personal comments to his three daily observations of temperature, clouds, precipitation, and wind. Through his eyes, we get a vivid glimpse of the cycle of life and weather in Missouri during the Civil War.

VIEW FROM A CIVIL WAR CORNFIELD

Notes from the observer:

Athens, Clark County, Mo., Latitude 41°31′, Longitude 14°45′ (west of Washington, D.C.) Observer: Joseph T. Caldwell

January 1864. This month of January, 1864 is the coldest weather that has been experienced for a number of years. From the 23rd day of December to the 23rd day of January, the ground has been covered with snow . . . on a level of 17 inches and has drifted to the height of the fences. Many roads that run south in course are full and (so) impassable that the community has to shovel out the snow that they could pass. The general depths of the drifts, six feet . . . . The beech and small timber was bent to the ground and a quantity of timber broken . . . . I will say that the tenth part of the timber will die on account of the snowstorm. The cattle . . . those that had sheds they lost none, but when they had to stay in the storm, ¼ have died. The cattle that has not been put in the enclosures, many of them stampeded to the timber and died before they could be found. Sheep that had sheds or houses done well, but where they had to stem the storm, ¼ have died, caught in the drifts and perished. Hogs that had good sheds would pile up and I would say that ½ of them were dead in that situation, but those that had to stand the storm, ¾ of them have died. The prairie chickens, they have ½ of them died; the quails have many of them died. Half the rabbits, many of them have been found dead for want of food. There has been many persons froze to death and many frosted badly. This winter will be a lesson long . . . remembered by all persons, that they must have their wood and coal ready for winter use, and not wait till winter to get it. They must have sheds for their stock and their feed at the barns (so) they can feed handy. There has been stock enough lost . . . this winter to have built every farmer sheds . . . . I will say that the farmers and all other branches of business have become careless in the last two years . . . . Their minds have been on the war, which I hope will wind up in the course of this year . . . .



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CASUAL PHENOMENA.

This month of January 1864 is the coldest weather that has bin experienced for a number of years from the 23 day of December to the 23 day of January the ground has bin covered with snow to the extent on a level of 17 inches and has drifted to the highth of the fences many roads that run South in lanes are full and impassable that the community had to shovel out the snow that they could pass the general depth of the drifts six feet we have had a deep snow before but not sow colde and not drifted [illegible] hard the timber was loaded down with snow the brush and small timber was bent to the ground and quantity of timber broken of more especially the Pin Oaks and Black Jacks which have the leaves on I will say that the tenth part of the timber will die on account of the snow storm. The Cattle when the storm commenced those that had sheads they lost none but where they had to stay in the storm one 1/4 have died the cattle that had not bin put in the enclosure many of them Stampeded to the timber and died before they could be found Sheep that had sheads or houses done well but where they had to stand the storm one 1/2 have died caught in the drifts and perished Hogs that had good sheads would pile up and I will say that 1/4 of them are dead in that situation but those that had to stand the storm 1/2 have died The Raised Chickens there have one 1/2 of them have died the quails have many of them died & the rabbit many of them have bin found dead all for the want of food There has bin many persons froze to death and many frosted badly. This winter will be a lesson long to be remembered by all persons that they must have there wood & cole ready for winter use and not wait till winter to get it. they must have sheads for their stock and there feed at the barns sow that they can feed handy there has bin stock enough lost in this vicinity this winter to of built very fine sheads, that the stock would look well if they had provided with them we would of not lost any Feed is scarce and high but the People with economy may get there but they have had something to learn them that a few leasure spent would be a fortune to them. I will say that the farmers and all other Branches of Business have become careless in the last 3 years in this part of the Country there minds have bin on the War. which I hope will wind up in the cours of this year then the minds will return to the former the Mecanicks in this State is different from that of Iowa or Ill. we have had the two Army to destroy and men had become disheartened they would put in one half they could of attended to the Mecanicks had nothing to do that of Iowa & Ill the farmer tryed to do all in his power and many buildings have gone up the dry season that we have had last year we have not Recorded had to amount to any thing all that I recorded last year have proved a failure on the account of drouth If you have any [illegible] we would like for you to [illegible] us and [illegible]

J. T. Caldwell

[illegible]

The comments of Joseph T. Caldwell in his own hand.

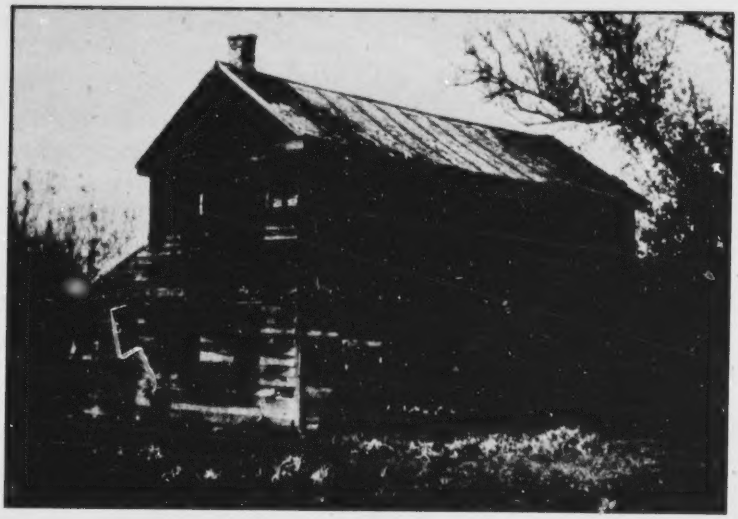
May 1864. In regard to this part of the country and affairs, there are 2/3 of the men in the Army . . . ¼ of them are in the Rebel Army or left the state. This leaves the country with many widows who are dependent on the husband's wages for support. Provisions is very high and has caused great economy, and has started many to industry, not only in the homes but many in the cornfields, thinking, while the husband is defending the government, she can raise enough to support a family. Home manufacturing is becoming common at every house.

I do not think there will be half the farms put in cultivation. Many are trying to put their farms in grass and gone into raising sheep. I think that there will be thousands shipped here to stock the county and, in doing, in a few years more, we will have one of the first wool states in the Union . . . . Before, our state was fenced in too much, cattle, mules and hogs was profitable, but the range is gone. The land is wore out to some extent and people are in the Army and manuring land is almost stopped here.

June 1864. On the night of the 1st of June, we had frost enough to bite the vines, and kill some of the hickory leaves, and turn the corn yellow . . . . Rye, wheat, oats and barley will make a fine crop, and busy commencing harvesting and hands scarce and commanding $2.00 per day, but the prices will justify the wages well. There will not be wheat enough for consumption, but there will be a fine surplus of rye and oats. Potatoes, onions and all other vegetables bid fair to make fine crop. Navy beans, and unless rain comes soon, they will not do well . . . . As for the season to put in crops, it has been fine and easy to attend to. There has been ¼ of the labors performed by women . . . . Taking all in consideration, there will be 2/3 as much as was raised in 1862 . . . the Spirit of Agriculture never was greater. And Domestic Manufacture—some five years ago there was not one wheel to every 20 families in this county. Now there is 9 out of 10 have them, and are putting them to use as in the days of '76. Who can make the finest piece of linen or the finest piece of janes. Economy is the conversation of the fireside, and a speedy end of this war; unconditional surrender to the Stars and Stripes . . . .

January 1864 was a rough month for unsheltered cattle in Missouri.

This building was Union Army headquarters during the battle of Athens, Mo., August 5, 1861.



July 1864 . . . . has been a fine month for closing out harvest and the most of it is in the stacks and barns and all . . . is fine, and a better prospect for corn never has been had than at this time . . . . There has been more work done to the land than I ever saw before. We have been blessed with rain, but the rains are sectional. We have some excitement here . . . on account of some bushwackers but all quiet now . . . .

February 1865. In the Mississippi River, the ice moved out clear past Keokuk, Iowa. The evening of the 20th February, ice 14 inches thick. The Des Moines River, the ice broke up the 22nd February. The ice on mill ponds, 18 inches. This has been the greatest weather for putting ice up that has been for years. Ice very clear and sound, and large amounts put up here . . . .

26th, 27th, some rain but our water courses have not risen only some seven feet which is less than usual. The frost on the ground in the prairies froze 18 inches; in the timber, froze 10 inches. The deepest freezing we have had for 4 years. Navigation of the Mississippi River resumed to Keokuk, Iowa. First Steamboat, *Kate Kerney,* landed. Belonged to the Keokuk and St. Louis Packet Company.

March 1865. For the first time in 20 years, on the 9th, the thermometer was 1 degree below zero.

On the 10th, in the morning, the thermometer was down to 4 degrees; 2:00 p.m., 10 degrees; 9:00 p.m., 15 degrees with an east wind which was uncommon to be so cold in this climate. On the 13th, heavy sleet, so as to break many limbs of timber such as willow . . . .

On the 18th, the wind south 45 in the morning. At 2:00 p.m., southwest 60 miles. At 9:00 p.m., 25 southwest. Some buildings unroofed. Great destruction with fencing and timber. The heaviest wind for six years.

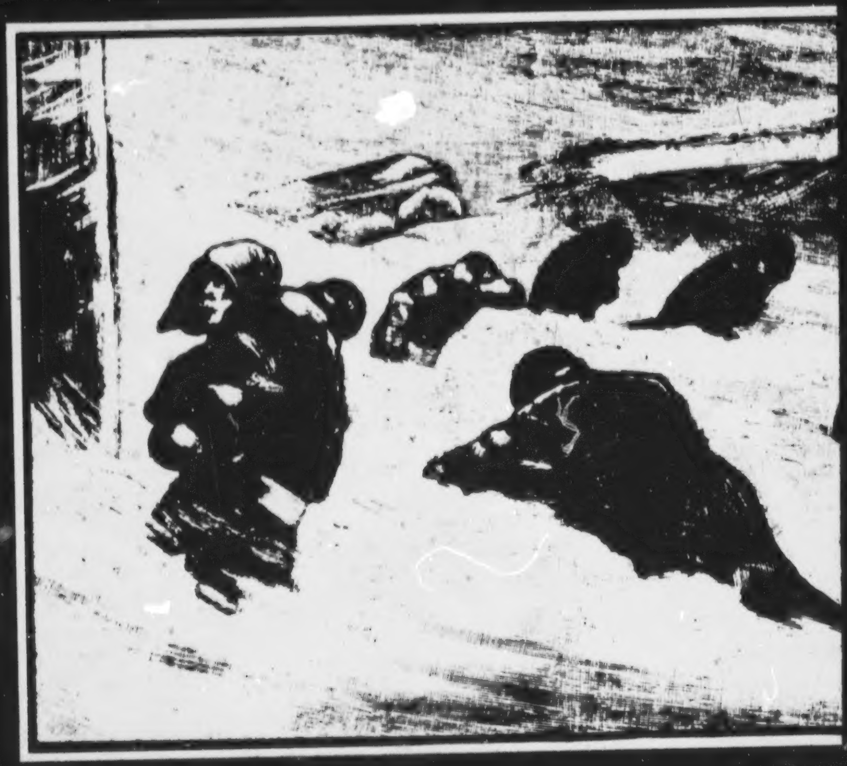
October 1865. The first frost, 16th, not too much damage. The 19th, eclipse of the sun 7:00 a.m. to 9:00 a.m. Appearance of the atmosphere, clear and visible to the eye. Snow the 24th, the first for the season. 1/16 of an inch. Ice, the first of the season, 1/4″.

March 1866. [Ed. note: Apparently Caldwell was ill; his weather entries are shakily written and the comments appear to have been written by his wife or daughter.]

Fickle March fairly outdid herself this year and more than sustained her fabled fickle reputation. 2nd, Des Moines River broke up. Ice gorged. Water overflowed everything higher than was ever known before. Great destruction of property. 13th, snow. 14th, snow all disappeared. 15th, snow in morning, all off before night. 17th, snow. 18th, rain accompanied by heavy thunder. 19th, misty rain and heavy hail, large as quails egg. 20th, foggy. 22nd, smoky, rain. 24th, snow. 27th, raining, sleet and snow. 30th, smoky. If the above is not a "bundle of contradictions," we will be indebted a new "Easter" to some correspondent that will oblige us with one.

April 1866. Fruit of all kinds, except peaches, showing a favorable prospect. Peaches failed to put in an appearance this spring owing to the excessive cold of the winter. Fall wheat on the prairie is generally killed. Other cereal OK. Farmers have made good progress in spring work. Providence interposing between us and frost, we may reasonably expect bountiful crops of every description.

Joseph Caldwell's observations ended in July 1866; the tradition of citizen weather observers did not. Today, thousands of Americans still take weather observations for the National Weather Service without compensation, or for only token payment. Their instruments may be more modern, but their spirit is still that of Joseph Caldwell. ■



THE BLIZZARD OF '88

"The snow fell fast and was caught by the wild winds and hurled everywhere . . . (it) came with such force into the eyes of the pedestrian as to blind him; melting . . . (it) would remain frozen fast to the eye, so that it was his constant work to protect his sight. The snow would follow the breath . . . into the lungs and . . . fill them with water, nearly choking him, if not quite doing the work of strangulation."

This is an eyewitness account of the blizzard of 1888 which affected one quarter of the country's population and isolated a dozen of its largest cities. It literally buried hundreds of towns and villages from Maine to Maryland.

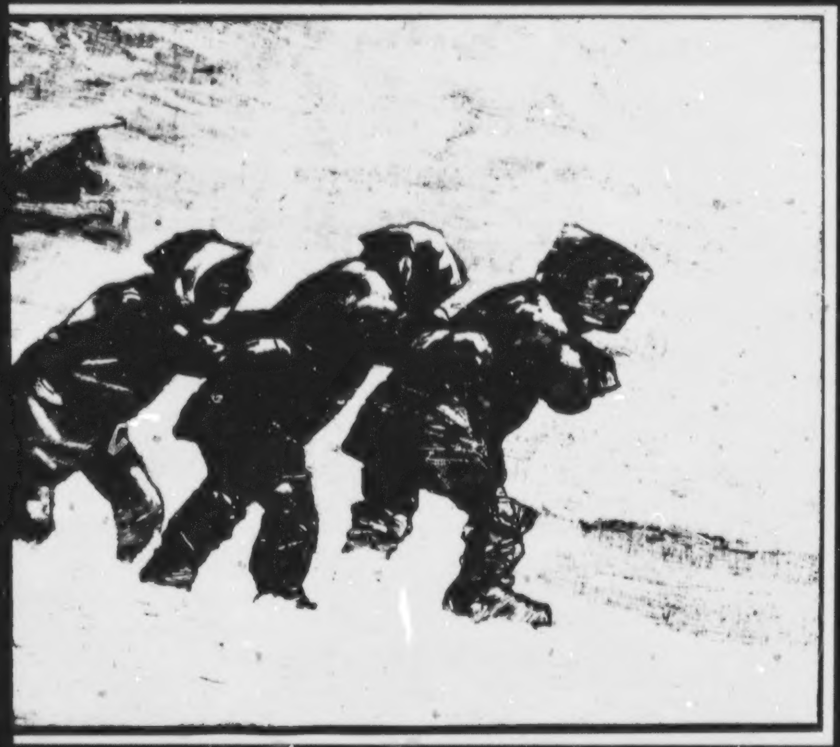
The blizzard cut off and immobilized Washington, D.C., Philadelphia, New York City, and Boston. Snowfall averaged 40 to 50 inches over southeastern New York State and southern New England, with drifts to 30 and 40 feet. In Middletown, N.Y., snowdrifts were reported to have covered houses three stories high. The townspeople had to tunnel through the snow like miners, even shoring up the passageways with timber. For 2 days, frequent gale-force to near-hurricane winds accompanied below-freezing temperatures which ranged from near zero to the low twenties over much of the area.

Men, women, and children died in city streets, in country fields, and on ice-choked ships and boats. Over 400 died, 200 in New York City alone. Thousands more suffered everything from exhaustion to amputation of frostbitten limbs. Some wandered blindly into snowbanks and died quietly. Others became hysterical, shouting and cursing the wind, pounding the snow in tearful frustration.

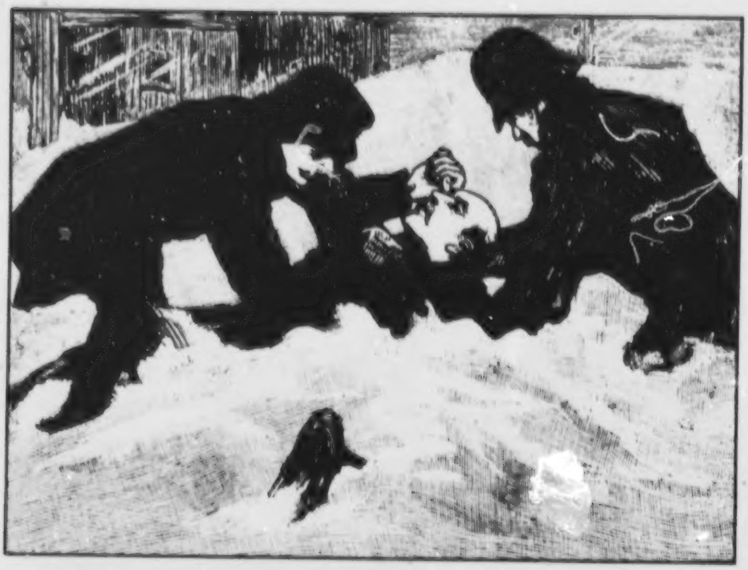
The great storm buried trains all over the Northeast, marooning passengers for days and in some cases a week or more. Water froze solid in the washrooms, and there was usually little or no food. Card tables and seats were chopped up and burned in small stoves, but the drafty cars were still unbearably cold. Many left the trains to search for food or shelter; some perished.

The blizzard was a marine disaster from Chesapeake Bay through New England. Some 200 vessels were sunk, grounded, or

The Blizzard of '88

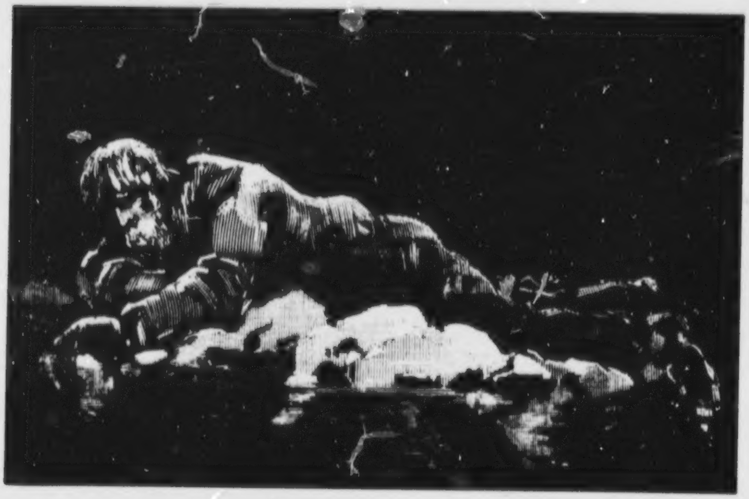


New York City (Brooklyn) at the height of the blizzard.



The body of George Baremore is found in a snowdrift on 7th Avenue.

The sole survivor of a schooner wreck.



wrecked and abandoned. At least 100 seamen died in the storm they called the "Great White Hurricane." Of 40 vessels in Philadelphia's harbor, only 13 escaped destruction or disabling damage, and at least 30 crew members perished.

In urban areas throughout the Northeast, telegraph, electric light, and telephone wires broke under the weight of wind, ice, and snow, and poles snapped and toppled. Railroad and steamship stations were jammed with stranded travelers. Overnight, the most populous section of the United States was transformed into an arctic wasteland where nothing moved, an alien world of wind and white.

Although the blizzard blanketed an area from Maine through Maryland and from Buffalo to Pittsburgh, it was in New York City that the great storm became a legend.

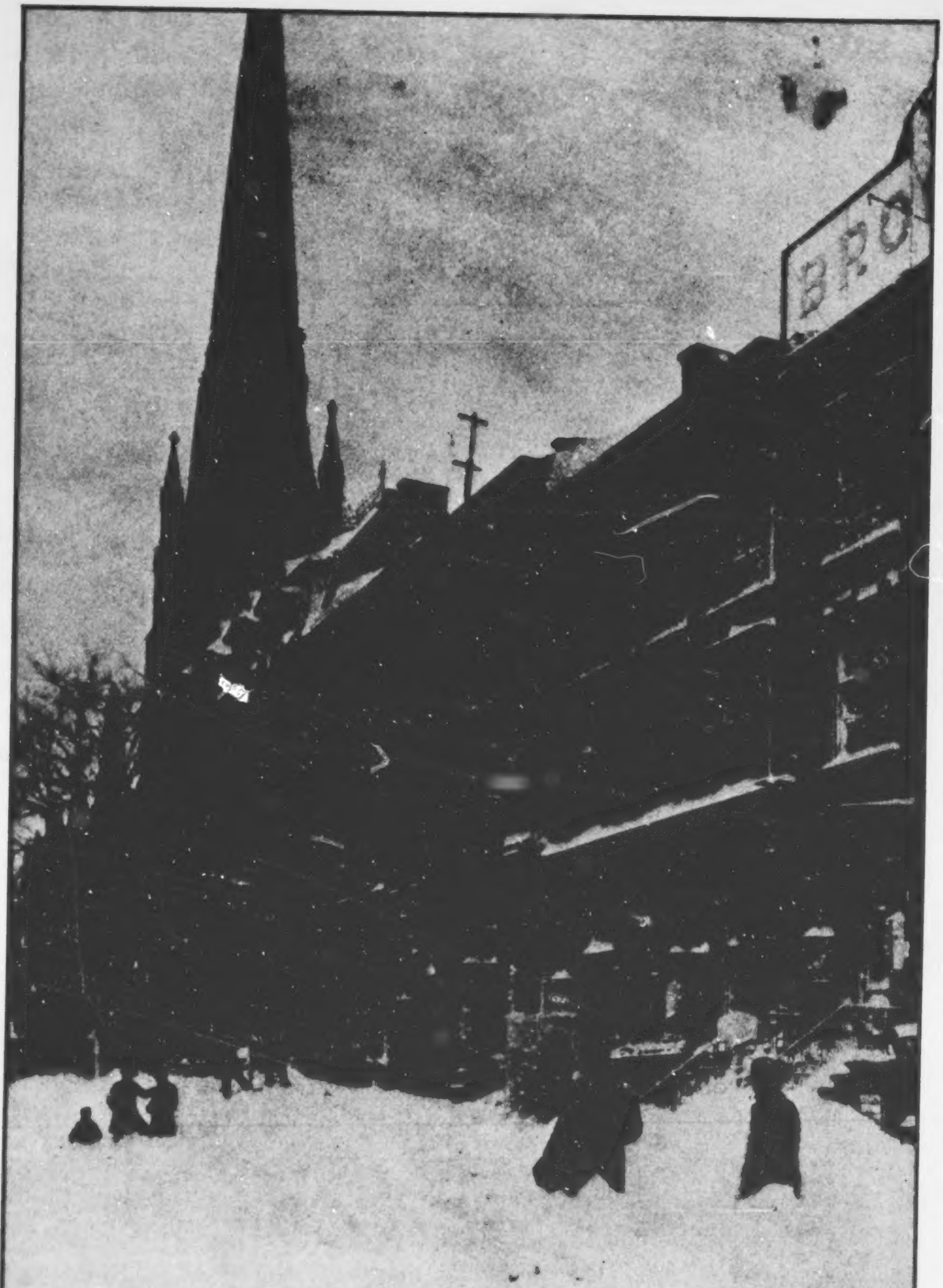
Saturday, March 10, 1888 was a warm and sunny day in New York. Grass was growing, trees budding, and men talking of the upcoming baseball season.

It began to rain Sunday afternoon. By evening the temperature had dropped, the wind was rising, and New York City's streets were coated with ice. The rain turned to snow just after midnight on Monday, March 12. The snow continued all day, accompanied by northwest winds that reached nearly 50 miles per hour and temperatures that dropped to near 10 degrees.

Most New Yorkers first became aware of the storm when they tried to go to work Monday morning. It was a period of economic depression, and no one was likely to stay home if he could make it to his job. They started out by the thousands, but relatively few reached their destinations.

The wind had swept sidewalks clean on the south side of many streets, while snowdrifts 15 to 20 feet deep covered brownstone stoops on the north side and sometimes reached the second floor. The wind was cutting, the snow blinding. And the storm worsened between 7 and 9 a.m., when most working people were out on the streets.

Men were blown off their feet and forced to crawl on their hands and knees past exposed areas. Pedestrians were sprayed with



Snowdrifts piled up to the second floor on many New York streets. The two gentlemen in the background are standing next to the top of a lamppost (see cover enlargement).

flying glass from shattered windows, and occasionally felled by falling chimneys or flying signs. Cheeks cracked in the stinging wind, and frostbitten noses swelled.

According to the *New York Times,* “the wind seemed to have a rotary motion as well as a terrible, direct propelling force . . . slinging the snow into doorways and packing it up against the doors . . . sifting it through window frames . . . piling it up in high drifts at street corners . . . twirling it into hard mounds around elevated railroad stations . . .as most New Yorkers had never seen before. For the first time in their lives they knew what a western blizzard was.”

Horsedrawn streetcars were abandoned all over the city, and the steam-driven elevated railway trains were soon stalled. Hundreds of people jammed wind-whipped platforms waiting for trains that never came. Wealthier New Yorkers offered fabulous sums to cab and carriage and even wagon drivers to take them a few blocks or a few miles. Prices ranged as high as $40, but in most cases the conveyance bogged down and both passenger and driver were stranded. Sometimes the horse was rescued, sometimes abandoned.

Those who did manage to reach work generally found no one else there or nothing to do. They had to turn around and try to struggle home again or find a place to stay in the city.

Out on the streets, policemen were administering first aid to hundreds of people and rescuing drunks from certain death in snowdrifts. As the storm worsened, many had sought shelter in nearby saloons, which did a record business. While the loss of life was small, serious accidents were numerous, and many people were victims of exposure and overexertion.

In Brooklyn, more than 20 letter carriers were found unconscious in snowdrifts, and a great number of poor families had to be carried from icy, unheated hovels to the nearest police stations which, by noon, were filled to overflowing.

Near City Hall, a policeman found four girls lying unconscious on the sidewalk. He dragged each of them across the street by their wrists to shelter in a nearby hotel.

Hotels, bars, private homes, and public buildings were jammed with people looking for shelter. Some eventually spent the night in jail on cots provided by the police, while a number of wealthy businessmen and bankers found themselves sharing quarters with skid row inhabitants; not a few had their pockets picked.

With trains, steamers, horsecars, and ferries halted, the city's only link to the outside world was the Brooklyn Bridge. Foolhardy pedestrians dragged themselves across hand over hand, clinging blindly to the railings as the biting wind cut them to the bone and blew their hats into the East River. The police eventually closed the bridge, for fear of someone being blown off or dying of exposure.

By nightfall New York City was an eerie, abandoned arctic landscape. Not a streetlight was on, and the streets were deserted. People stranded in the city knew nothing of those at home, and wives and children could only guess the fate of father or husband. Exaggerated rumors of deaths and disaster were everywhere, as the storm continued unabated.

Three hundred people spent Monday night in Grand Central Station and were still there Tuesday night. More than two dozen trains were stranded enroute to the city, with 10 stalled in northern Manhattan alone.

The Albany Express was snowbound for 48 hours at Hastings-on-Hudson, north of the city. The passengers were so impressed by nature's interruption of their daily lives that they formed an association called "The Snow Birds," and resolved to meet annually on March 12 to commemorate the event.

Charles Palmer, who worked on Broadway, left Stonington, Conn., at 12:30 Monday, and 2 hours later he and 180 other passengers were stuck in an 18-foot drift. They stayed there for 2 days, except when compelled by hunger to send a foraging party to a nearby farmhouse. One of the volunteers was badly frostbitten and was thought to have suffered "permanent injury."

Among the passengers was a Mrs. Parker with a nurse and two small children. When her brother learned of her situation, he hired a tugboat and reached Sable Point, about 5½ miles from the train at about 10 a.m. Wednesday morning. It took him and his rescue party 4 more hours to plow through the snow to the train. Besides the four ladies and the babies on board, Palmer and one other gentleman were rescued. The other 170-odd souls were still stranded on Thursday and, according to Palmer, might be there much longer, as the railroad had made no efforts to send out a rescue party.

Back in the city, residents began clearing the sidewalks early Tuesday morning, after the snow tapered off to a light fall. The snow had packed down hard, and axes and picks were needed to break it up.

Most New Yorkers left for work Tuesday morning before the snow shovelers began working, burrowing through or climbing over drifts as big as a 60-ton locomotive. Broken windows, wrecked signs, torn awnings, and snowbound cars and wagons greeted them everywhere.

Sleighs, skis, and snowshoes became common sights on Fifth Avenue, Broadway, and other main thoroughfares, and the city looked more like Moscow than New York. One woman commented that it was strange to see sleighs sliding over snowbanks at the level of second-story windows.

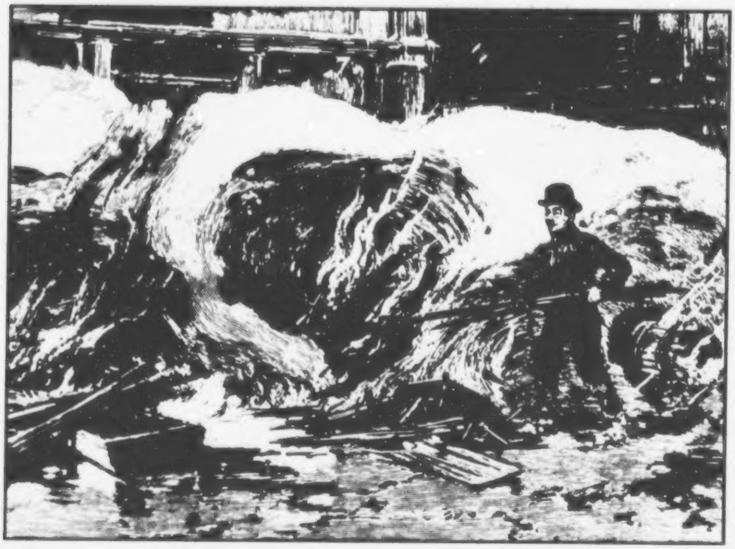
There was suffering in New York's East Side slums, where thousands of immigrants were crowded into the city's shabbiest tenements. Food was scarce, and coal ran out; there was no milk for babies. Except for milk and dairy products, there was no real food shortage. Supplies were scarce only because they couldn't be delivered. East Side inhabitants lived from day to day, buying their coal by the pailful, their flour by the pound, their butter by the half pound, and their tea by the quarter pound. The stores they dealt with kept small stocks, which they replenished once a week. Monday was their usual purchasing day, after the weekend trade had cleaned them out. The blizzard made it impossible for the wholesale houses to deliver.

Many store owners raised prices. Coal went from 10 cents to 20 cents a pale and, according to the *Times,* "Eggs sold at 40 cents wretched butter at 60 cents, the poorest beefsteak—called steak only by the most barefaced mendacity—for 30 cents a pound."

Paradoxically, the blizzard proved a financial blessing to the city's poor. Any man or boy able to lift a shovel could make at least double the normal laborer's wages. Street car companies, street cleaning agencies, and many private organizations were giving work to all comers at $2 or more a day. The biggest bonanza of all was shoveling snow for private homeowners and shopkeepers. Many men made as much as $10 a day, and all were paid well above scale. The shoveling was still going on by Friday the 16th, and the end was not in sight.

It required thousands of men to clear the principal streets of snow, and most of the laborers were recruited from the East Side. Facing removal of an estimated 20 million cubic feet of snow, Superintendent Green of the Street Cleaning Department remarked that the city was fortunate the storm came in March, rather than December or January, when a freeze would have caused indefinite paralysis.

Burning holes in the snow after storm.



City streets remained clogged for days after the storm, while sidewalks shovelers piled up great mounds of snow along curbs.

Ferries began making occasional runs to New Jersey Tuesday morning, and elevated trains started running sporadically a few hours later. Many people were injured during the day from falls on the wind-exposed, glazed pavements, and by midafternoon, the police had shot some 20 horses that had broken legs.

On Thursday, March 15, with bright sunshine and rising temperatures, a thaw set in. Soon ponds, puddles, and small lakes appeared, and many basements were flooded. The situation was particularly bad in Brooklyn, built on a series of hills and valleys and vulnerable to serious flooding.

People who had been snowbound in the suburbs or country towns began to arrive in the city by midweek, and with each train came tales of higher snowdrifts. The highest reported was a 52-foot drift in the neighborhood of Gravesend, reported by a John McKane. Great damage was reported at Rockaway Beach, where new buildings under construction for the electric light company, part of a hotel, and numerous small buildings had been blown down.

Many casualties were discovered during the days following the storm. The body of a boy about 12 years old was found in the snow at Cypress and Fulton Avenues, East New York. Although not identified, it was thought to be that of a newsboy who had left the Howard House in Canarsie on Monday and not been heard from since.

An Irish coachman who had driven his carriage all day "Blizzard Monday" had died just after reaching home, and the little son of Baker Provst, who had started out on his daily delivery rounds on Monday, was missing and presumed dead.

An unknown man was dug out of a drift on Fulton street and died at the City Hospital without regaining consciousness.

Henry Henrihan, of Raritan Township in nearby New Jersey, left Milltown Monday morning to go home. He was "somewhat intoxicated" at the time and had not been heard from since. When the neighbors went to his home to tell Mrs. Henrihan, they found her dead in bed, a victim of cold and hunger, and her children half-starved and frozen.

Snowbound in New Jersey

The following is the personal account of a gentleman caught by the storm during a Sunday visit to friends in Jersey City Heights, and of his attempt to return to New York City on "Blizzard Monday."

It never for a moment occurred to me to regard this storm as a thing to prevent me from getting to New York. I thought, of course, that owing to the high winds and the isolated condition of the house that there was more snow there than anywhere else, and that as soon as I got into the regular streets it would be all right. The Jackson avenue station of the New Jersey Central was only five or six blocks from the house, and I anticipated not the slightest trouble in getting there. . . . I bade my friends a fond adieu and started for town. It was still snowing and blowing . . ., and not a print had been made in the snow about the house. . . .

A great bank of snow, piled up against the shrubbery lining the sidewalk confronted me, but I could see comparatively clear valley on the other side and I took a running jump to clear it. . . . (The) top of my hat was the first part of my person to strike the snow, and my head and neck and the greater portion of my fall overcoat followed it into the freezing hole it made. This wasn't pleasant, but with melted snow going down my trousers leg into my boots, I got out to the gate and into the "street," and was then able to discover the real snow.

It was everywhere. Great piles of it rose up like gigantic arctic graves . . . in all directions. Every way that I turned I was confronted with these awful mounds. I took my bearings and steered for the Jackson avenue station. Every step I took I went in to my knees in snow and every other step I fell over on my face and tried to see how much of the stuff I could swallow. The wind was at my back and its accompanying snowflakes cut the back of my head and my ears like a million icy lashes. . . .

I . . . plowed my way, jumping, falling, and crawling over the drifts, some of which were nine or ten feet high, and regaining my wind in spots where the snow had been driven away, and after an hour and ten minutes I got at the end of my six blocks. There were trains there, two of them, but they were stuck as fast as if somebody had suddenly dumped hogsheads of mucilage about them. There were passengers in them, too, half-frozen and wholly disgusted, some of them women. . . . There had been one train run through in the morning, but that was all. . . .

I gave up the idea of going to New York. . . . My trip back to the house was simply awful. The wind was straight in my face and beat so in my eyes that I couldn't see a rod before me. My mustache was frozen stiff, and over my eyebrows were cakes of frozen snow. My gloves were of kid, and by the time I had gotten halfway back I thought my hands would break off at the wrists. I stumbled along, falling down at almost every step, burying myself in the snow when I fell, struggling frantically up only to sink deep down again. Then I began to feel like a crazy man. Every time I fell down, I shouted and cursed and beat the snow with my fists. I was out there alone, and I knew it, and if I should get down some time and not be able to get up I knew that I might just as well say my prayers. Then it got dark. The wind howled and tore along, hurling the icy flakes in my face, and the very snow on the ground seemed to rise up and fling itself upon me.

In one of my crazy efforts to forge ahead, I caught just a glimpse of the welcome gate posts, and then I laid down on my back and "hollered." I felt as if I couldn't move a limb if $40,000,000 was held above me. Somebody heard my cries, and just as I was going off comfortably to sleep my friend came plowing out through the snow, and he and his man dragged me into the house.

—New York Times, March 16, 1888

Samuel Randall, an 80-year-old Long Island farmer, went out to the barn to feed his horse and cattle on Monday night and lost his way coming back to the house. Two elderly women who had been nursing his sick wife went out in search of him and, after a half-hour found him nearly frozen to death. They tried to carry him into the house, but failed and had to leave him to save their own lives. No other help could be found before morning, when he was discovered dead.

The storm played havoc with New York's fleet of pilot boats and other shipping. Ice had to be cut constantly from the riggings; meanwhile, heavy waves sent spray over the vessels from one end to the other, and the ice formed again with incredible speed. The sails became so stiff they broke like glass. Many crews were forced to take to the ships' yawls and were caught by the gale winds. The lucky ones were carried up on the shore. One of the yawls, a 600-pounder, was blown over and over nearly 150 feet up on the beach.

The *Niagara,* arriving from Havana, reported that Sunday night her deck had been covered with knee-deep snow. At noon on Monday, a high wave carried away 40 feet of her railing on both sides, swept away ventilators, smashed cabin windows and stove in doors. The Captain called it the heaviest storm he had ever experienced. Captain Murray of the Steamship *Alaska* said the wind "blew a hurricane," and estimated its velocity at 70 miles per hour.

Some 30 funeral processions bound for Calvary Cemetery on Long Island on Monday had stalled in snowdrifts; bodies had to be taken into nearby houses overnight. Several horses and carriages were completely covered with snow, and drivers and mourners narrowly escaped death. In one instance, a party of four had to be dug out and carried unconscious to a nearby hotel.

Two days later, an undertaker started for the New Catholic Cemetery on West Side Avenue to bury Martin King. At Bolton and Montgomery Streets the snowdrifts were impassable. The undertaker produced two hand sleds, lashed the coffin to them, and pulled it to the cemetery leaving the mourners to manage the passage as best they could.

On Wednesday, with the streets still buried under snowdrifts and temperatures still frigid, Adolph Osborne, a wealthy lawyer, applied to the court for a dispossess notice to evict Mary McMahon, a widow, from a tenement he owned.

"I don't dispossess anybody today," said Justice Kenna, to the cheers of the crowd of loungers in the courtroom, who had already begun to heckle Osborne.

"But I want this woman put out," said the lawyer.

"Well you can't get it done through me."

"But I want my rent," said Osborne.

"I can't help that. You will just have to wait."

Osborne left the court, "followed by the taunts of the crowd."

is the right place to take them
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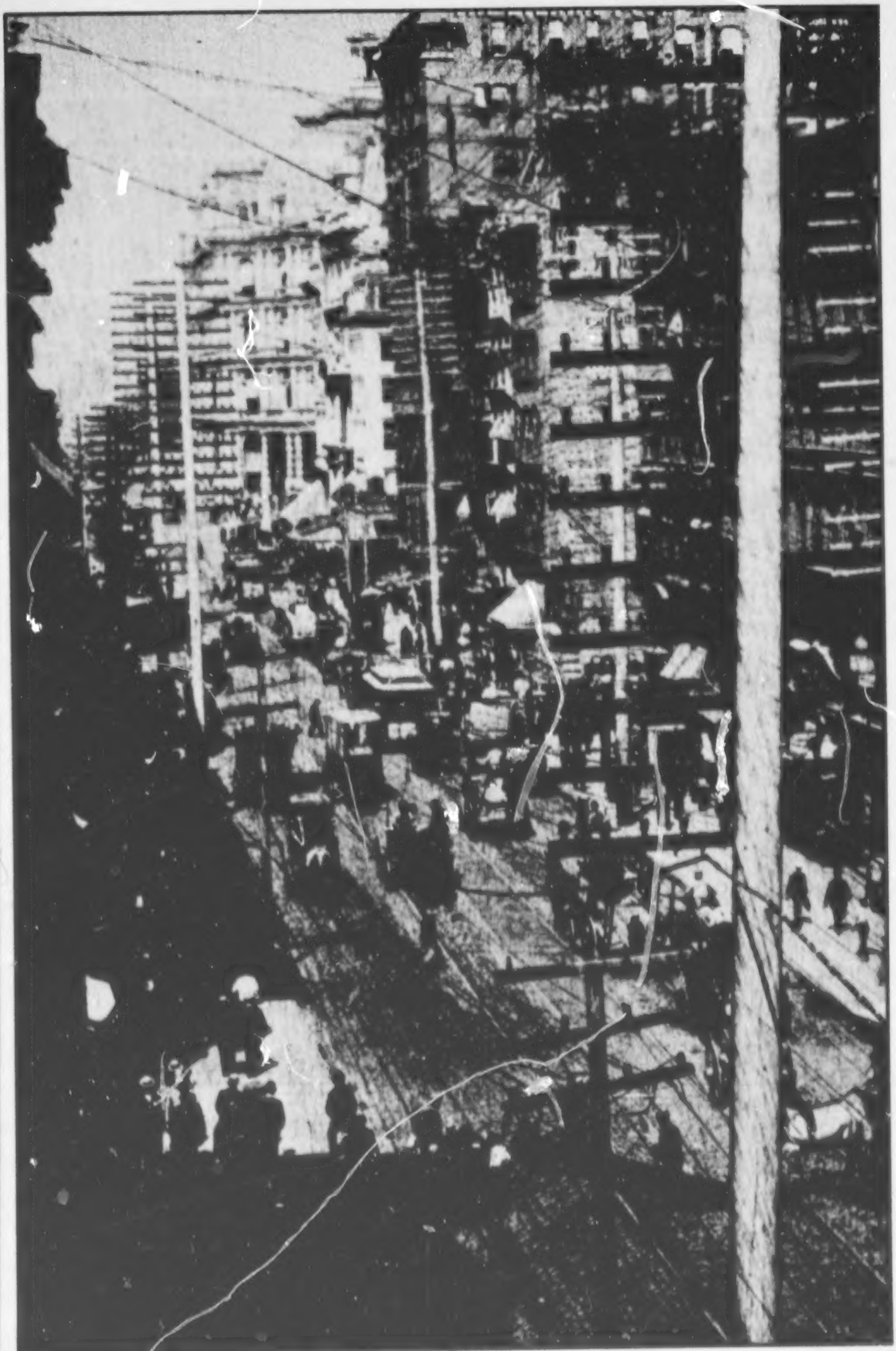
DALL, THE CH

Proud veterans of the great Blizzard of '88.



The Blizzard of '88 was not the most violent storm ever to visit the Northeast. Maximum wind velocities recorded ranged from 48 miles per hour at New York City to 60 miles per hour at Atlantic City, and 70 miles per hour at Block Island. The winds accompanied a severe cold wave of unusual duration and an almost unprecedented snowfall. It was this combination that so indelibly imprinted itself upon the memory of those who experienced it. As a result, the storm became a legendary event, and many parents named babies born during its visit "Snowflake," "Snowdrift," "Snowdrop," "Storm," "Tempest," and even "Blizzard" to commemorate the event.

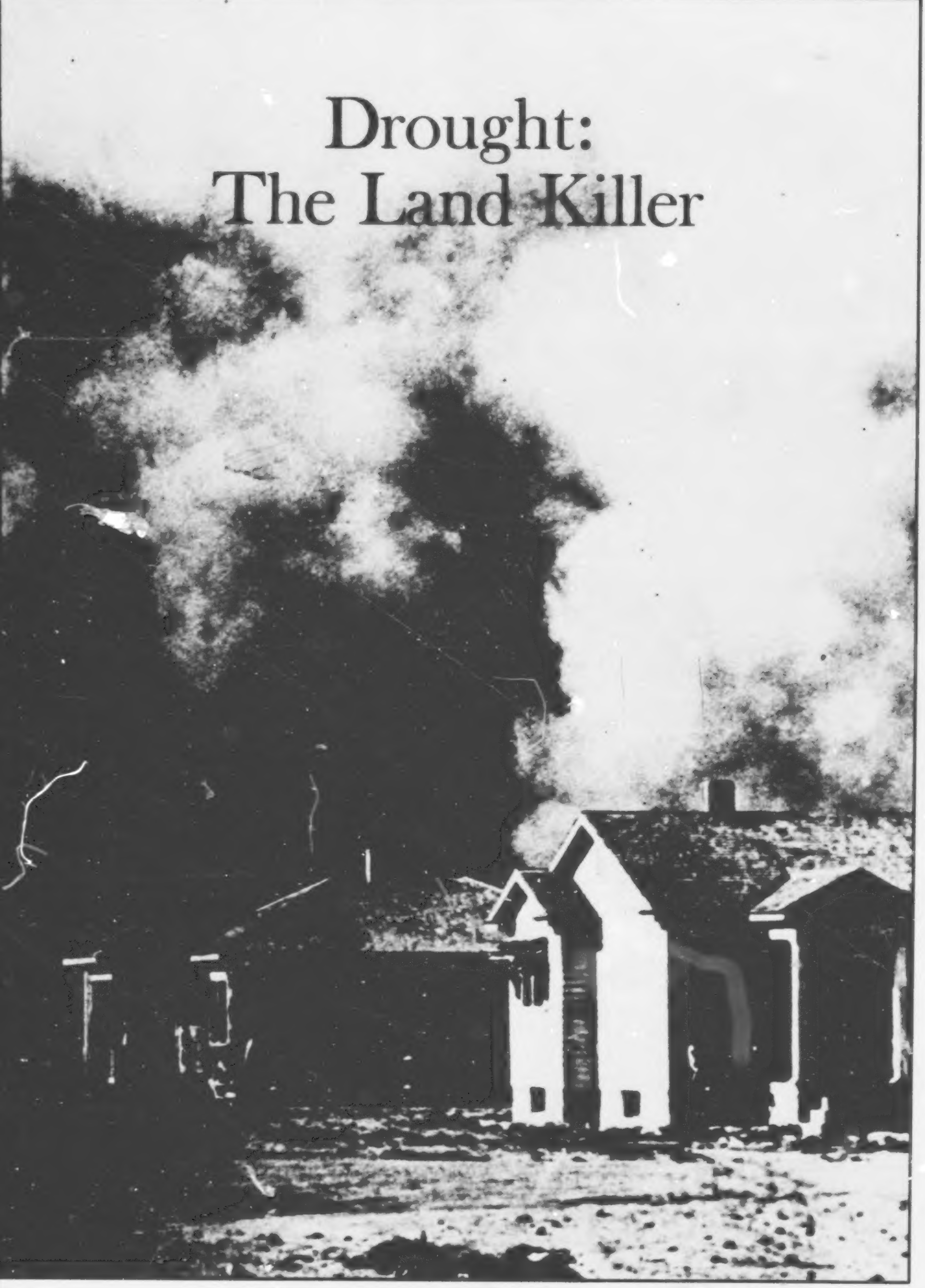
Other veterans formed clubs to meet annually on March 12, the anniversary of the storm. One of these, "The Blizzard Men of 1888," was still meeting in New York City as late as 1941, to award a silver cup for the most interesting personal account of the storm.

The Blizzard of '88 impressed the Government, as well as the people. The Nation's Capital was completely cut off from the rest of the country for almost 24 hours. Said a United States Senator: "We cannot control the elements . . . we can protect our communications . . . wires now running overhead must be placed underground in urban areas and thus shielded from the caprices of nature. Not only are the overhead wires unsafe and unslightly . . . they are a damned menace to the security of the United States of America."

Within a few years, city telegraph and telephone wires did go underground. ■

Broadway from Maiden Lane (New York City) in the 1880's. The Blizzard downed wires throughout the Northeast, cutting cities and towns off from the outside world. As a result of the storm, wires in most metropolitan areas were soon put underground.

Drought: The Land Killer



In the 1930's rolling black clouds of dust often engulfed large areas of the country's midsection.

DROUGHT: THE LAND KILLER

On "Black Sunday," April 14, 1935, a dust storm engulfed Stratford, Tex., and despite their dust masks many people suffocated.

"These storms were like rolling black smoke. We had to keep the lights on all day. We went to school with the headlights on and with dust masks on. I saw a woman who thought the world was coming to an end. She dropped down on her knees in the middle of Main Street in Amarillo and prayed out loud: 'Dear Lord! Please give them another chance.'"

This was the eyewitness account of a Texas schoolboy during the dust bowl drought of the 1930's, when for 4 years great clouds of blowing topsoil often obscured the sun over much of New Mexico, Colorado, Oklahoma, Kansas, and the Texas Plains.

As bad as the dust was, it was only a symptom. The disease was drought, a cancer on the land that returns again and again to haunt the farmer and cattleman and to remind the city dweller of his ultimate dependence on nature.

The drought of the 1930's, which coincided with the economic disaster of the Depression, has indelibly imprinted on American minds the image of dust-streaked Texas and Oklahoma farm families abandoning their parched, dusty land for the green promise of California. Much of this notoriety is a direct result of the terrible dust storms of 1935-37, when unusually strong winds joined with the drought to produce a natural disaster. Other droughts have been as bad, but usually less spectacular. Farming methods then in use were such that if the weather was dry and windy, the soil would just blow away. And it did.

For some parts of the country, the drought of the 1950's was worse. In Texas, it was the worst on record. Most of Texas' quarter of a million square miles did not have what old timers call "a public rain" for 5 or 6 years.

The drought seems to have begun along the Rio Grande River in 1950; by the fall of 1956, western farmers were praying for rain. Relentlessly, one of the worst droughts in our recorded weather history spread across America's heartland. Acre after acre, mile after

During a drought, the bottom of streams, rivers, lakes, ponds, and even reservoirs lie naked and cracked.

mile of parched, barren land stretched from horizon to horizon.

Dr. Edmund Schulman of the University of Arizona's Laboratory of Tree Ring Research, studying the concentric rings of thousands of trees (where wet years are recorded as wide rings and dry years are narrow rings), concluded that it was the worst drought to afflict the American Southwest in 700 years.

Major rivers could be jumped on foot, and the bottom of giant reservoirs lay naked and cracked. Irrigation canals—the life blood of farms in arid western States—ran dry. In a few places, dust storms actually created small, mobile deserts, with sand dunes moving forward in wavelike ripples with every breeze.

In 5 years the drought took $2,700,000,000 from the pockets of Texas farmers and ranchers alone. Stockmen in Arizona, New Mexico, Oklahoma, Kansas, Colorado, and Nevada had to sell or butcher even their breeding stock, while dairy farmers of Kansas and Missouri, unable to find feed or water, were forced to liquidate herds they had spent their lives building.

In Kansas, two-thirds of the State's 115,000 farmers had to find off-farm jobs, while in Oklahoma, farm families were moving off the land at the rate of 4,000 per day by 1957. In Texas, exranchers were pumping gas or working at the general store or roadside hamburger joint. Many of these men were working off their own land for the first time in their lives. The young men, in particular, moved to the cities.

Despite the scope and duration of this drought, the total misery of the dust bowl days was missing. With the national economy booming, jobs were available in nearby towns and factories, and most farmers and ranchers could ride out the hard times. And advances in farming practices such as irrigation, deep plowing, and the use of cover crops made it possible in many areas to save the soil from the wind. Even the dust storms were relatively few and far between, while the government's soil-bank payments, liberalized credit, subsidization of stock-feeds, and other measures helped the drought-stricken farmer and rancher get by.

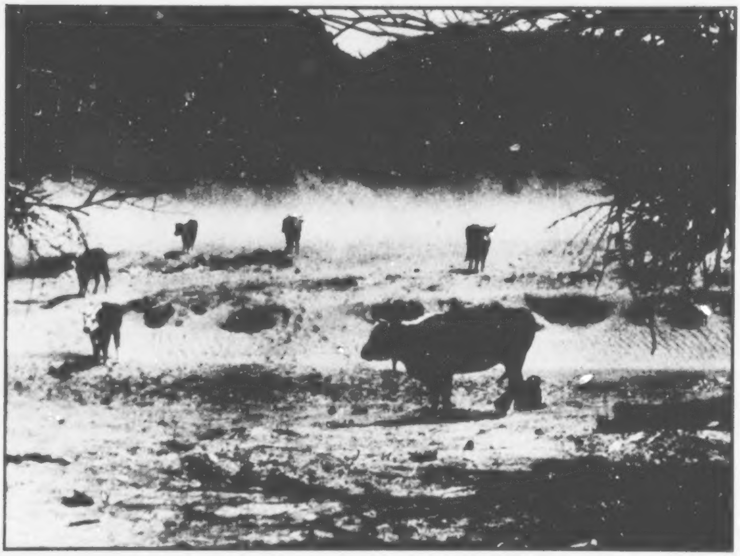
The situation even generated a kind of grim humor, such as the Texas story: "Well, the wind blew the ranch plumb into Old Mexico, but we ain't lost everything. We get to keep the mortgage."

The Northeast's worst drought in 160 years began in the early 1960's. It brought unemployment to loggers, government disaster aid to dairy farmers, irrigation to tobacco fields, a private rainmaker to Fitchburg, Mass., and severe or critical water shortages to scores of cities and towns in the most thickly populated section of the United States.

New Yorkers or visitors could get a glass of water in a restaurant or hotel only if they asked for it. It was forbidden to water lawns or wash cars, and steel harnesses were installed on fire hydrants to prevent street bathing, a longtime summer sport for city children.

Real concern over this prolonged period (1961-67) of predominantly dry weather arose in October 1963, about the warmest and

Blowing dust, Raton, New Mexico, during the 1950's drought.



dryest October of record over most of the United States east of the Continental Divide. Forest fires were numerous, and continuing drought in the Great Lakes region caused an alarming drop in lake levels. A few wells and springs in the Northeast failed in 1963, but many went dry in 1964. Early in 1965, the reservoirs for the City of New York were down to 25 per cent of capacity.

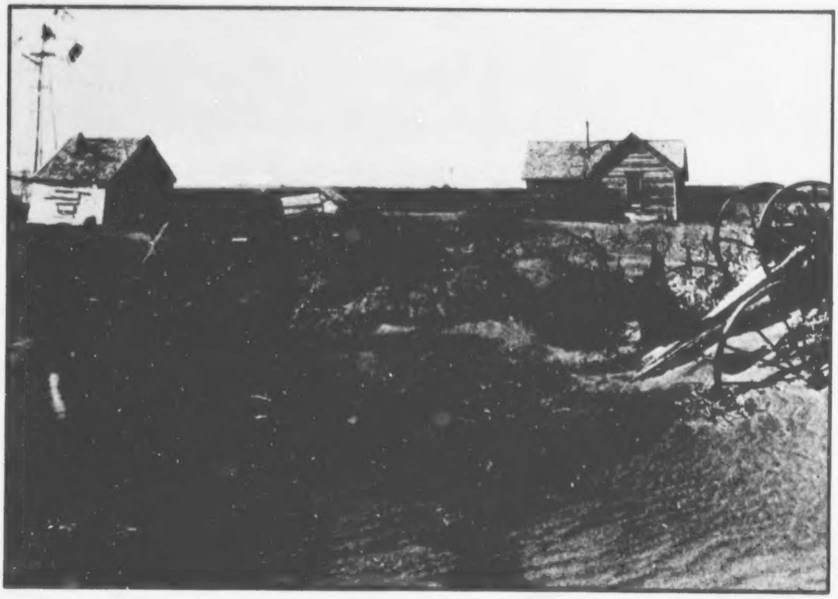
After mid-1965, the heart of the drought area shifted southward to the Potomac River Basin. By the summer of 1966, residents of the Nation's Capital were facing the grim possibility of water rationing.

The unusual thing about the Northeast drought was its duration. Past weather records suggest that a drought lasting 5 years or more in this area would occur on the average only once in several centuries.

Drought returned to the Southwest in the fall of 1969 and visited southern Florida the following year. Abnormally dry weather set in over southern California and parts of Arizona in late 1969, spread across New Mexico and west-central Texas by mid-1970, and over central and south Texas in the fall of 1970.

In February 1971, high winds coated northern Texas and parts of Oklahoma with a thick layer of dust. In March, dust generated by winds gusting up to 43 miles per hour obliterated the Sun over parts of Texas for 9 hours. Three days later another dust storm, lasting for 17 hours, blanketed West Texas in a choking, blinding shroud of dust. By April, many parts of Texas had had no appreciable rain for many months, over 2 million acres had been damaged by wind erosion, and huge tumbleweeds were drifting across baked, barren land.

In Texas, Oklahoma, New Mexico, and Arizona cracked soil and dry lake beds characterized the countryside. By June, cattle and sheep were weak and thin. Many starved to death. Ranchers sold out and went to look for jobs in the city. Some farmers went bankrupt, and others borrowed to the hilt. Most of the 200,000 bats that live in the Carlsbad Caverns of New Mexico fled their caves, where there was no food or water. They could be seen in thick flocks in



The dust bowl drought of the 1930's blew away the soil and dotted the nation's heartland with barren, deserted farms.

the town of Carlsbad and along the Pecos River hunting water insects. Even gravediggers complained, because the dry ground was so hard to dig.

Meanwhile, south Florida from Orlando to Key Largo was suffering its worst water shortage in more than 200 years. Abnormally dry weather began in mid-1970. By the spring of 1971, the drought, augmented by the ever-increasing water demands of a growing population, reached disaster proportions. Haze and smoke from thousands of Everglades grass fires were shrouding the sky. The fires, coupled with the lack of water, drove thousands of animals and fish from their natural homes.

The Everglades swamplands, normally covered with shallow water, were so dry that in some places the soil itself—peat formed from centuries of decaying vegetation—was burning. Such fires are almost impossible to stop until they burn down to rock or sand. If enough of the soil burns, the Everglades could become a desert.

DROUGHT: THE LAND KILLER

Drought has been a scourge of man since he first appeared on this planet. Unlike a hurricane or flood, drought creeps up on you. Initially, everyone welcomes the long spell of fine weather, but appreciation gradually turns to apprehension as water supplies decrease, and eventually to despair as crops wither, streams are reduced to a trickle, and little islands begin to appear in reservoirs. No one knows why drought came, if or where it spread, nor how long it will stay.

In the simplest terms, a drought is a prolonged and abnormal water deficiency. Severe or extreme drought conditions can result in near zero crop yields, serious livestock feed shortages, lack of water for cities and industries, greatly increased fire hazards, and a general disruption of the local or regional economy. If a large-scale drought is severe enough and lasts long enough, it can seriously damage the Nation's whole economic structure.

From time to time droughts of similar severity occur in two or more areas with vastly different climates—New Jersey, for example, as compared to eastern Oregon. Each area is affected in its own way. Extreme drought in New Jersey usually means low water tables, deficient streamflow, depleted reservoirs and, now and then, serious shortages in soil moisture. In eastern Oregon, on the other hand, extreme drought produces dry ranges, critical fire hazards, and a shortage of water for irrigation and livestock use. The many and varied effects of a prolonged drought depend on the peculiar climatic conditions and established economies of the areas affected.

The terrible experiences in the Great Plains in the 1930's when, at one time or another, serious drought afflicted the entire midsection of the country from Canada to Mexico, and from the Great Lakes to the Sierras, brought home to farmers the climatic truth that the semi-arid lands of the West could not be farmed by the same methods used on the farmlands in the more humid eastern portions of the country. Since then, a number of techniques have been developed to promote maximum absorption of the moisture and minimum loss of topsoil due to dryness and high winds. These include new farm

The drought and high winds of the 1930's showed that the semi-arid lands of the West could not be farmed by the same methods used in the more humid East.

An Oklahoma farmer raises a fence to keep it from being buried by drifting sand.

machinery that covers the soil surface with wind-resistant clods, terrace farming, and "trashy" or stubble mulch farming, which leaves the remains of previous crops exposed to stabilize the soil and promote better absorption of rainwater. Improved farm technology, however, is no substitute for a good rain.

From 1948 to 1962 drought accounted for 39 percent of all indemnities paid to farmers by the Federal Crop Insurance Corporation. The next largest weather category—floods—accounted for only 14 percent of the total losses. With each succeeding year a drought takes an increasing toll of capital and resources and leaves more and more farmers and ranches—and those with whom they do business—with nothing except debts.

During the drought of the 1950's President Eisenhower—remembering the drought that helped plunge his own father into debt—summed up the personal impact of drought on hundreds of thousands of rural Americans in these words: "Of the many natural forces that wage war on farmers and ranchers, the most demoralizing is a prolonged drought. In its grip the individual farmer is well-nigh helpless."

Droughts are prolonged weather anomalies, and conditions have always returned to normal sooner or later, thus the outlook is always favorable for the end of a drought. Often the problem is surviving until nature is ready to resume more moderate ways.

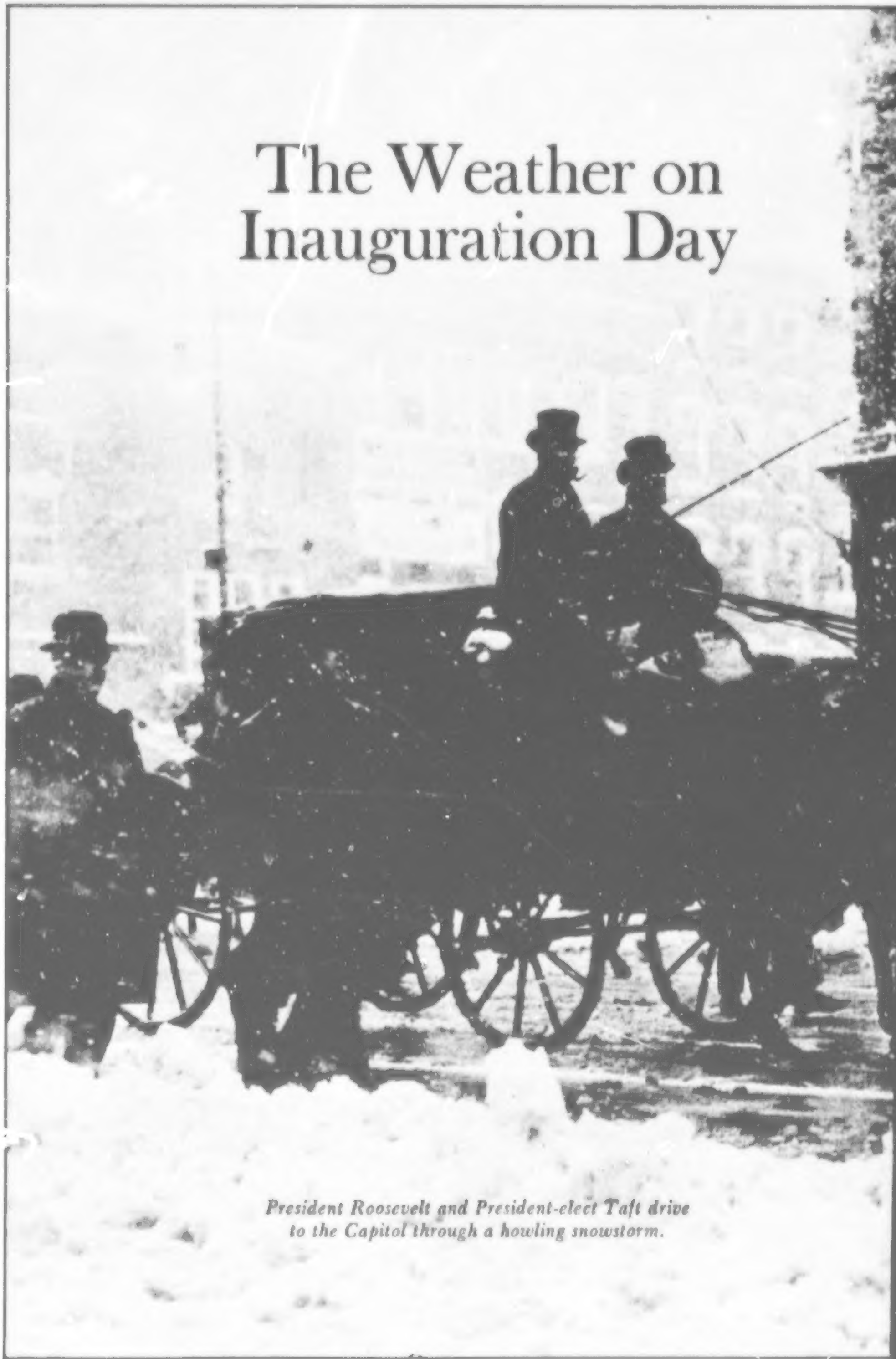
The dynamics of drought are not very well understood, certainly not to the degree where we can predict its occurrence, duration, or intensity. Meteorologists usually explain a specific drought in terms of abnormal atmospheric circulation cutting off precipitation in the affected area. This explanation, however, says nothing about the fundamental forces which produce the unusual circulation pattern. Solar cycles, the relative temperature difference between ocean and continent, volcanic eruptions (which eject large amounts of dust into the air and thus may alter the Earth's radiation balance), and changes in the gaseous composition of the atmosphere have all been blamed. The actual cause of drought may include any or all of these, and possibly other factors as well.

Meteorologists generally discount the idea that manmade effects are responsible for droughts. While urbanization and pollution can definitely influence climate, most weathermen think that these artificial factors are too weak to affect the great upper-air circulatory wind patterns that flow around the globe.

According to past performance, a major drought seems to occur in the Great Plains and American Southwest about every 20 years. There was drought there in the 1890's, the teens, the 1930's, the 1950's, and again in the early 1970's. (The drought in the East in the early 1930's and again in the 1960's were separate phenomena, and not part of this pattern.)

These quasi-periodical occurrences of drought are not regular enough to predict, but rather show up in after-the-fact analyses. This apparent relative regularity may be misleading; the 100 years or so of weather records available is too brief a period to definitively establish long-term climatic trends. Drought predictions based on past history currently present about the same problems as predicting the behavior of the stock market from past performance. Both are highly speculative ventures. ■

The Weather on Inauguration Day



President Roosevelt and President-elect Taft drive to the Capitol through a howling snowstorm.

THE WEATHER ON INAUGURATION DAY

It has been reported that Harry Truman, upon receiving the official invitation to his second inauguration, wrote across it in reply, "Weather permitting, I hope to be present—HST." If so, Truman, a student both of humor and history, paid Presidential tribute to one of the most durable of American traditions—bad weather on Inauguration Day. It is a tradition that deserves respect.

The first American President to die in office was a victim of Inauguration Day weather, and of his own contempt for its consequences.

At 68, William Henry Harrison was the oldest man ever to become President, and the last President born (1773) before the American Revolution. His Inauguration Day in 1841 was cold, blustery, and overcast—so chilling that building owners along Pennsylvania Avenue reportedly charged $500 for window space to watch the parade (for $1 you could take a quick look).

Ignoring the biting wind, the old soldier refused the offer of a closed carriage. Instead, without hat or overcoat, he rode a magnificent white charger in the 2-hour procession from the White House to the Capitol, where his inaugural address took an additional 1 hour and 40 minutes. Later, he returned to the White House on horseback in another slow-moving parade. That night, after attending three inaugural balls, again lightly dressed, the hero of Tippecanoe returned exhausted to the Executive Mansion, where he suffered a "chill." The weather continued raw and bitter in the weeks that followed, and Harrison persisted in ignoring it, wearing neither hat nor coat, while the chill became a lingering cold. One morning he went out in a downpour and got soaked to the skin, then returned to the drafty White House where he worked all day in his wet clothes. His cold deepened into pneumonia, and Harrison slipped into a coma. He died on April 4, 1841, a victim of his militant disdain for the elements.

Abraham Lincoln may not have developed pneumonia from the weather that almost wrecked his second inauguration in 1865, but a lot of other people probably did. It had been raining in the

East for 2 days. Washington was so deep in yellow mud that a story was going around that Army engineers had tried to lay a pontoon bridge between the Capitol and the White House, but had been forced to abandon the project because the "bottom" was too soft to hold the anchors of the workboats.

Despite the downpour, a crowd of drenched men, women, and children waited patiently in front of the Capitol and cheered when Lincoln came out, just moments after the rain finally ended. Dark clouds were still scudding across the sky as Lincoln began his inaugural address, but soon sunlight broke through and lit the face of the Capitol behind him.

"The worst weather on the face of the earth," said one eyewitness Congressman of the snowstorm that nearly buried the inauguration of William Howard Taft in 1909.

Heavy snow began the day before and continued through the night, driven by a stinging, whistling wind. Branches and telegraph and telephone lines snapped under the weight of the wet, clinging snow, while the wind toppled trees and poles. Pedestrians were quickly driven indoors and carriages and streetcars stalled as a thick white mantle submerged the deserted streets of the Nation's Capital.

Six thousand shovelers struggled vainly through the night and forenoon to clear the areas in front of the White House and Capitol, and the route between. As noon approached, the storm still howled on unabated. People stood huddled in doorways or peered out at the arctic landscape through snow-streaked windows. Postponing his decision until the last moment, Taft finally decided to take his oath of office in the Senate Chamber, rather than on the outdoor platform erected in front of the Capitol. Ironically, the snow stopped just a few minutes later and despite the icy, piercing wind, people began lining Pennsylvania Avenue for the inaugural parade.

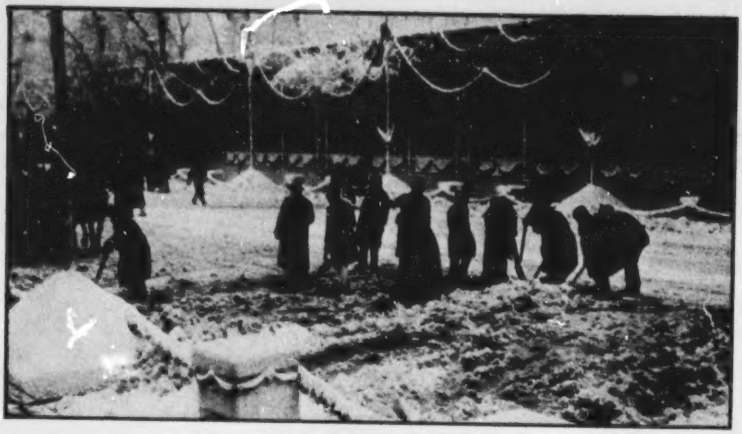
Some 20,000 marchers sloshed past the snow-covered stands flanking the parade route. The wind howled through their ranks, playing particular havoc with the high-hatted representatives of various political clubs, while decorations and bunting whipped about in wind-torn shreds or sagged sadly under heavy burdens of snow. All in all, it was the worst Inauguration Day weather in the nation's history. Quipped President Taft to a reporter friend: "I always knew it would be a cold day when I got to be President."

A startlingly similar storm paralyzed the Capital City on the eve of John Fitzgerald Kennedy's inauguration in 1961. It left 8 inches of snow and caused the most crippling traffic jam in the city's history. Hundreds of motorists were marooned; thousands of automobiles, abandoned. Because of the storm, the President-elect had to cancel his dinner plans and, in struggling to keep other commitments, is reported to have had only 4 hours' sleep.

Heavy snow began falling in the afternoon, and by evening streets and roads were impassable. Thousands of motorists were stranded in the storm. Police switchboards were swamped with calls from people trying to find wives, husbands, and children who had not come home. Many of the missing were still sitting in their stalled cars trying to keep warm, where they would remain for hours before help reached them. Others simply abandoned their cars wherever they stalled, and set off on foot through the blinding storm.

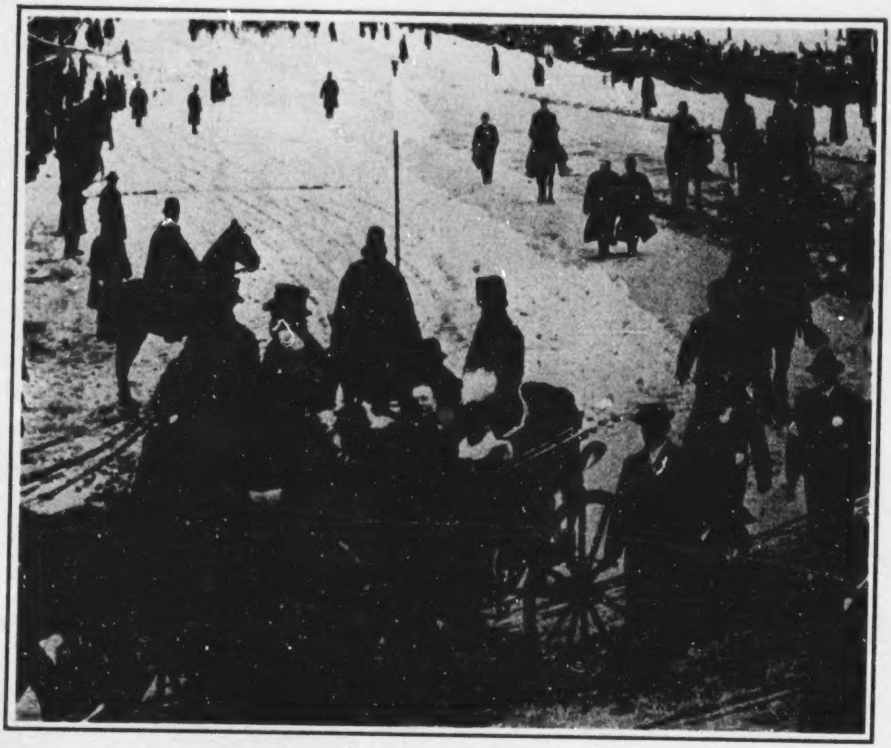
The snow ended by sunrise, but it was bitterly cold, and a biting wind was to blow all day. Snowplows and sanders had worked throughout the night, and the inaugural parade route was in reasonably good shape. By noon, when the ceremonies began, the temperature was a chill 22 degrees, and a biting 19 mile-per-hour northwest wind cut through the thickest clothing.

Some 20,000 shivering spectators sat huddled between snowbanks at the Capitol Plaza to witness the swearing-in. Later, despite the icy blasts, an estimated 1 million people watched the inaugural parade, which included 30,000 marchers, a PT boat, and the 8 surviving members of the crew Kennedy had commanded in World War II. As twilight came, the cold deepened and people began drifting away. By the time the last marcher had passed, the President, his brother Robert, and Robert's wife, Ethel, were almost alone on the reviewing stand.



Clearing some of the nearly 10 inches of snow off Pennsylvania Avenue in front of the White House.

President Taft and his wife return to the White House after his swearing-in at the Capitol. The snow had tapered off, leaving a street scene more suggestive of Moscow than Washington.



Obviously, there is more than a little historical support for Truman's respect for Inauguration Day weather. Of the 47 quadrennial ceremonies held to date, 19 were plagued by substantial rain or snow, bitter cold, or chilling winds. Despite this rather dismal record, however, the odds are high that the weather for future inaugurations will be more pleasant.

The reason? The 20th Amendment which, beginning in 1937, changed the date for Presidential inaugurations from March 4 to January 20. Weatherwise, the change means considerably less chance of rain or snow, though it favors lower temperatures. Bearing this out, of the 9 inaugurations held since 1937, only one—that of John F. Kennedy—was marred by significant precipitation. On the other hand, one out of every three inaugurations held on March 4 was notable for its wet and miserable weather.

Weatherwise, the change to January 20 seems to have been a fortunate one, and more than 100 years of weather records for that date are equally encouraging.

Even though the coldest time of the year in Washington comes during late January and early February, temperatures on January 20 are usually not severe. The normal high temperature for the day is 44 degrees, the low, 29 degrees. The highest temperature on record is 71 degrees, in 1951; the lowest, 8 degrees, in 1940. If it does rain or snow in Washington, D.C., on January 20, the odds are that it will do little more than wet the pavement.

Average weather conditions for noon, when the President-elect is usually sworn in, would be a temperature of about 37 degrees, a wind of 10 miles-per-hour or less, and partly cloudy skies. Chances of precipitation during the swearing-in ceremony itself are about 1 in 6 and of snow, about 1 in 13.

Of course, it will rain or snow on occasion, and January temperatures and winds will often make standing outdoors for several hours a chilling experience.

Whatever the odds, history seems to suggest that the weather often ignores climatic expectations on Inauguration Day. This impression is reinforced when you consider that the weather was beautiful for the first seven inaugurations—all held indoors (although George Washington took his first oath of office on the balcony of Federal Hall in New York City)—but turned sour soon after the ceremonies were moved outdoors.

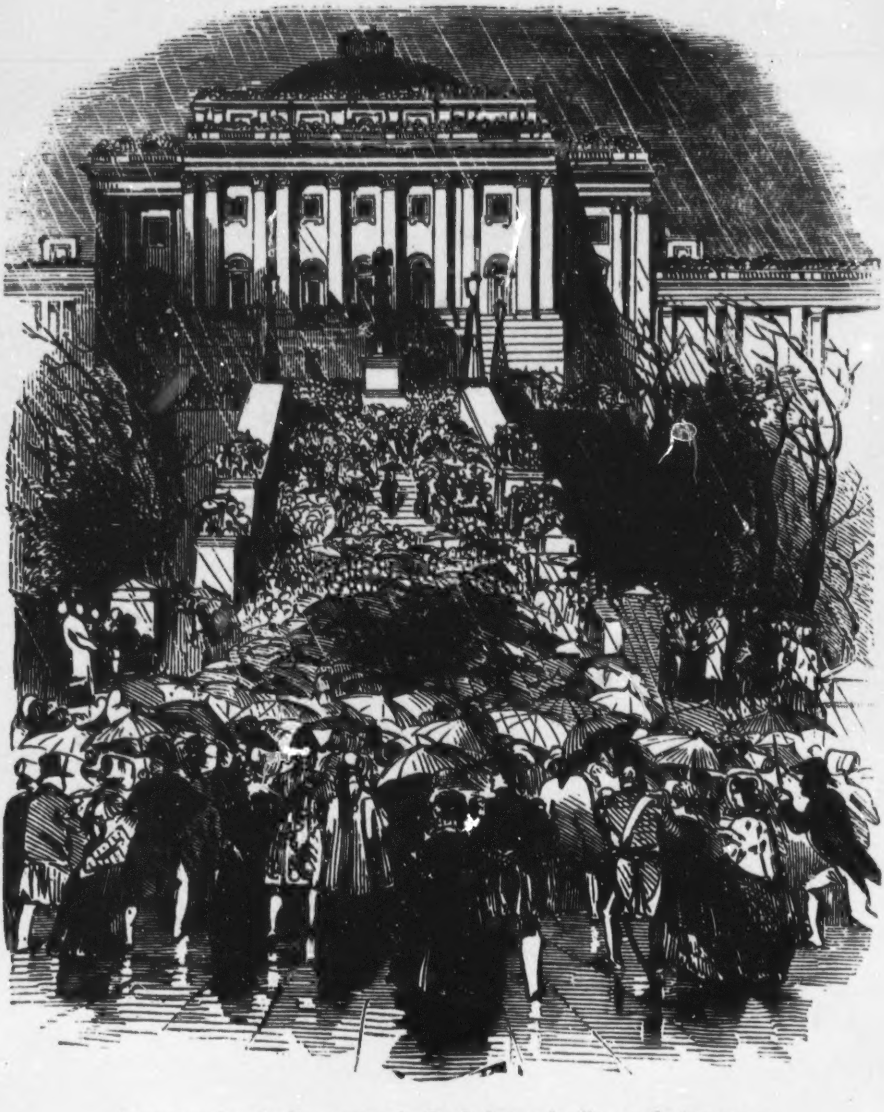
Tradition has it that the First Congress chose March 4 as Inauguration Day out of respect for the Sabbath, because it is the date that quadrennially falls least frequently on Sunday.

All but the first three inaugurations took place in Washington. The first was held in New York City in 1789, the second and third in Philadelphia, in 1793 and 1797, respectively, before the Nation's Capital was moved to the new Federal City in 1800. The first outdoor inauguration was James Monroe's, held in Washington on March 4, 1817. Almost as if to lull participants into a false sense of security, the weather was warm and sunny, with not a cloud in the sky.

Bad weather struck the very next inauguration, Monroe's second, in 1821. For the first time, Inauguration Day fell on a Sunday and the ceremonies were postponed until Monday the 5th. According to the *Daily National Intelligencer,* a "good deal" of rain and snow fell during the night. John Quincy Adams, a student of weather (as were George Washington, Benjamin Franklin, and Thomas Jefferson before him), recorded rain for Sunday and snow for Monday.

Whatever the elemental sequence, precipitation continued through Inauguration Day, forcing Monroe to change his plans for an outdoor ceremony, and to take his oath of office in the House Chamber, where an "immense crowd" of subdued spectators in soggy clothing thronged the Gallery to witness the swearing-in.

Although the amount of precipitation that fell is not recorded the noon temperature is—a chilly 28 degrees. The observation was taken by John Quincy Adams, who was to succeed Monroe as President. On Adams' own Inauguration Day, in 1825, it rained—the weather observation again being recorded by Adams. Once again, the ceremonies had to be held indoors.



A canopy of umbrellas covers the Capitol steps leading to the temporary platform on which James K. Polk took his oath of office in 1845.

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In 1845, just 4 years after President Harrison's fatal exposure to the elements, James Knox Polk took his oath of office in the pouring rain. A sea of umbrellas was all that could be seen from the temporary platform where the President-elect insisted on being sworn in. On the Mall below him, thousands of spectators stood ankle-deep in mud as the roar of the rain on their umbrellas drowned out Polk's inaugural address.

The parade back to the White House was a shambles. Floats had been reduced to soppy paper-and-cloth monstrosities and, as Polk's carriage moved up Pennsylvania Avenue in the downpour, the President saw mostly the backs of spectators splashing to shelter.

Franklin Pierce was inaugurated President of the United States on March 4, 1853; it snowed most of the day. Heavy snow greeted the President-elect when he awoke in the morning and continued until 11:30 a.m., when it seemed the sun might come out. President Pierce had just finished his oath of office and was beginning his inaugural speech when the snow began again, scattering many of the onlookers. Cancelling plans for a parade back to the White House, Pierce dropped ex-President Millard Fillmore and his wife off at the Willard Hotel, then continued on to the Executive Mansion.

Abigail Fillmore, wife of the outgoing President, had caught a cold as she sat on the exposed platform during the swearing-in ceremony, a cold that soon deepened into pneumonia. She died at the end of the month.

Ulysses S. Grant was the victim of a meteorological doubleheader. It rained on the morning of his first inauguration in 1869, and 4 years later he took office on the coldest Inauguration Day on record.

When cannon fire announced the dawn on March 4, 1873, the temperature was just 4 degrees above zero; by noon, it had risen only to 16 degrees. Throughout the day, icy winds gusting up to 40 miles an hour buffeted the city, knifing through the heaviest clothing and chilling to the bone all who ventured outdoors.

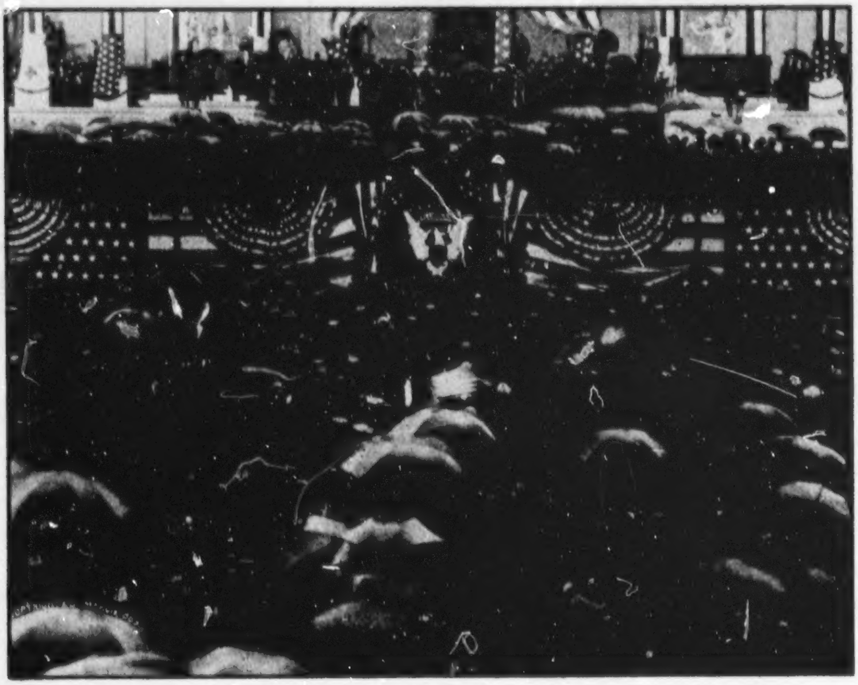
Despite the wind and cold, large crowds filled the streets. Heavy clothing and earmuffs were the uniform of the day, except for West Point cadets and Annapolis midshipmen, who were to parade without overcoats. When President Grant delivered his inaugural address, the wind made his words inaudible, even to those on the platform with him. Meanwhile, a number of lightly dressed cadets and midshipmen, who had been standing on the windswept Mall for more than an hour and a half, lost consciousness and collapsed; several were reported "frozen."

It was almost as cold at the inaugural ball that night, held in a $40,000 temporary building erected on Judiciary Square. The contractor had neglected to install heating equipment. It was so cold that the guests danced in their overcoats and heavy wraps, and when the President left just after midnight, so did everyone else.

James Garfield's Inauguration Day took place on March 4, 1881. It snowed all the night before, and by midnight deep drifts were everywhere. The next morning, streets were impassable, except for Pennsylvania Avenue between the Capitol and White House where workmen had spent the night shoveling snow from the street onto the sidewalk as fast as it fell. The snow finally ended about midmorning. Most of the decorations were ruined, and snow-covered bleacher seats originally priced at $5 now sold for 50 cents. There were few takers. As Garfield delivered his inaugural address, a chill wind whistled through still-naked tree limbs and the temperature hovered just 1 degree above freezing.

In 1889, Benjamin Harrison, despite his grandfather's fatal exposure 48 years earlier, insisted on taking his oath of office and delivering his inaugural address in the pouring rain, then stood outside reviewing the parade until dark. (The evening before Harrison had taken his usual long daily walk, also in the rain.)

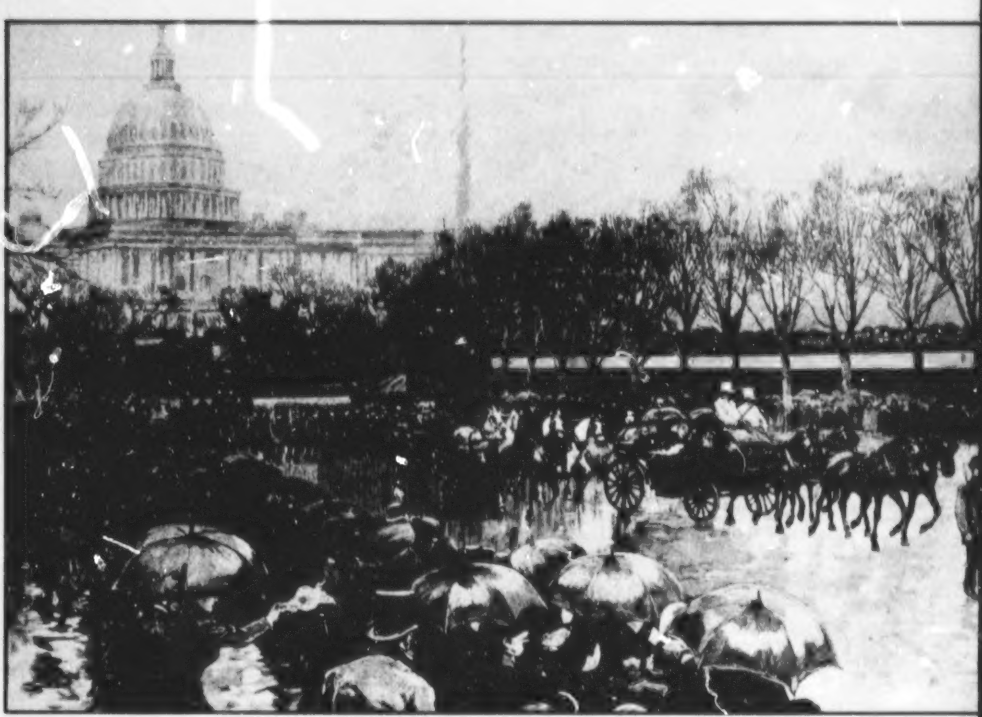
March 4 fell on a Monday, and it had been raining hard all weekend. When the dripping Presidential procession arrived at the East Portico of the Capitol for the ceremonies, however, some 20,000 spectators stood waiting on the Capitol Plaza, their massed umbrellas buffeted by wind and rain.



Despite his grandfather's fatal experience 48 years earlier, Benjamin Harrison takes his oath of office and delivers his inaugural address in the pouring rain.

Harrison took his oath of office under an umbrella, his words drowned out by the downpour. Despite his inaudibility, the President-elect stood in the rain and delivered a very long, rambling inaugural address. When he finished, only a few thousand spectators remained; even his wife and daughter had gone indoors.

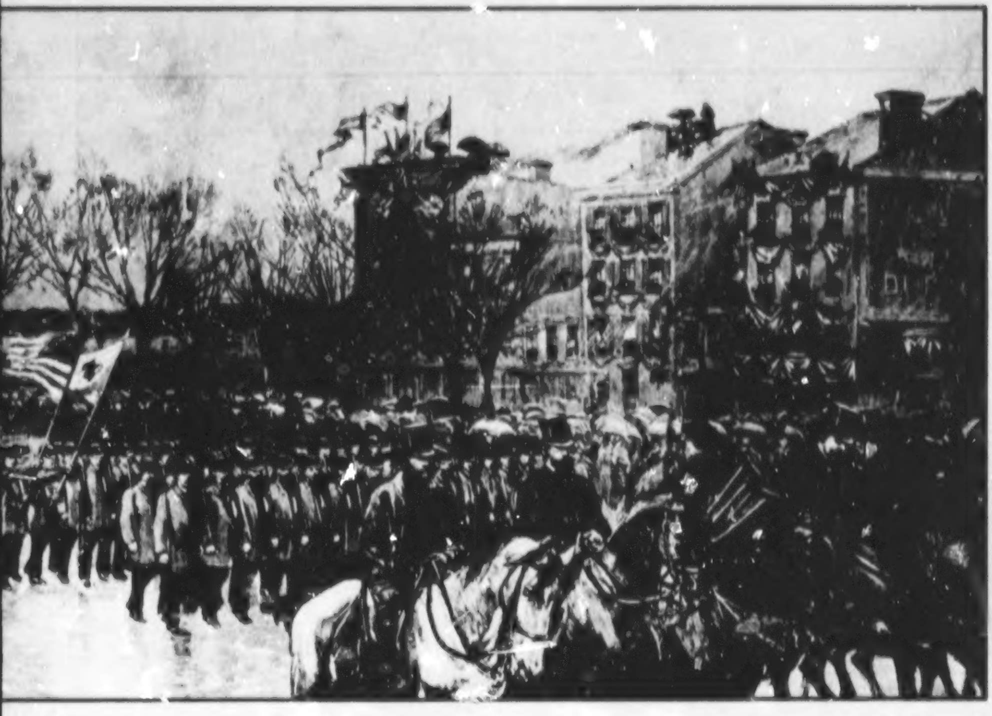
Still undaunted, Harrison went to the White House reviewing stand to watch the inaugural parade. By dark, the surrounding stands were deserted, except for a few solitary figures huddled under shiny black umbrellas. Harrison still stood there ignoring the pouring rain, as if settling a personal score with the elements. As a precaution, however, he wore a special leather shirt under his outer clothing.



Benjamin Harrison's inaugural parade.

Four years later, Grover Cleveland (who also preceded Harrison as President) started his second term in a snowstorm. Rain began falling the previous evening, but by early morning had changed to snow. By midmorning, when Cleveland left for the Capitol, the snow had tapered off, but a biting northwest wind was whistling through the city and the temperature was in the low 20's. Pennsylvania Avenue was almost deserted, and Cleveland's mustache reportedly glistened with tiny icicles as the President-elect rode to the Capitol for the ceremonies.

Some 10,000 shivering people were huddled around the inaugural platform when the President-elect arrived; according to a



contemporary account, many kept warm with "jokes and flasks." The snow stopped about one o'clock, but the wind whipped in icy blasts, cracking the robes of the Supreme Court justices like rifle reports. Cleveland clutched his high hat tightly in his left hand and began his inaugural address. The wind caught his words and carried them to the crowd. High winds continued throughout the day, and a fireworks display scheduled for the evening had to be cancelled

Bad weather also cancelled the fireworks display planned for William McKinley's second inauguration in 1901. Rain began during the swearing-in and continued through most of the afternoon. The crowd that witnessed the inaugural oath was described as the smallest in many years; only a handful of people sat scattered among the 7,000 seats facing the temporary platform erected on the East Portico of the Capitol.

In 1929, Herbert Hoover was sworn in, delivered his inaugural address, and then marched in intermittent rain that began just before he took his oath of office and continued throughout the day. The weather did little to dampen the spirits of the crowds which jammed Pennsylvania Avenue, making it impossible for anyone to run for cover during the downpours. Most of the spectators endured the drenching good-naturedly; many, with water running down their faces and coat collars, laughed at the soaking.

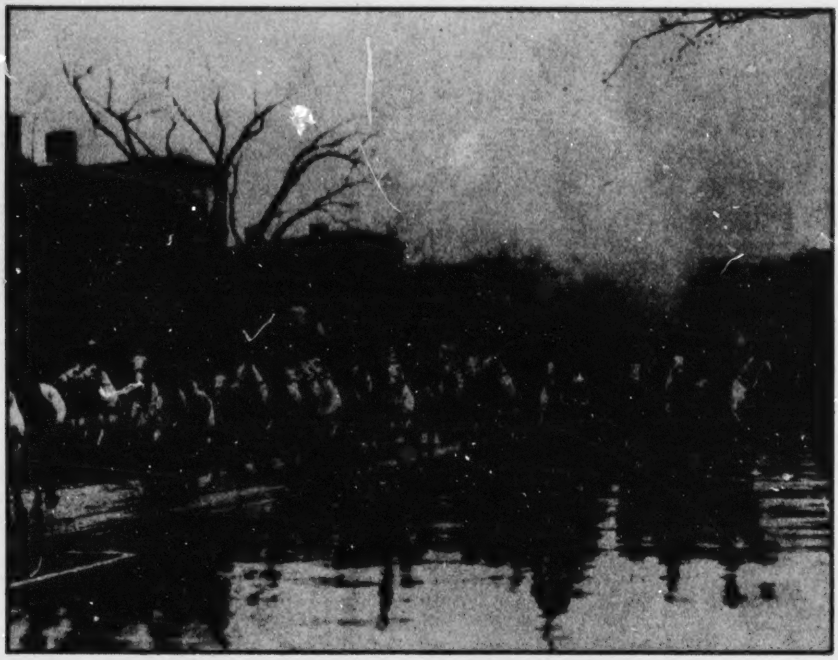
Just before the swearing-in, it began to rain very hard, but with an estimated 100,000 people thronging the Capitol grounds and nearby streets, Hoover went ahead with the outdoor ceremonies. The new President was drenched by the time he completed his inaugural address, his face beaded with water and his suit wringing wet. Nevertheless, he returned to the White House and, an hour or so later, was back outdoors reviewing the parade of 20,000 as it passed in the downpour.

Thirty-two years later, on another Inauguration Day, a snowstorm prevented former President Hoover's plane from landing in Washington, and he had to miss the swearing-in of John F. Kennedy.

These are some—though by no means all—of the weather woes that have plagued past inaugurations and Presidents. With the exception of Kennedy's in 1961, each of the inaugurations described took place on the old date, March 4, rather than on January 20 when, statistically speaking, the chances favor fair weather.

Unfortunately, you can lose even when the climatic odds are with you. The very first inauguration held on January 20—that of Fraklin Delano Roosevelt in 1937—was almost washed out by one of the heaviest rains in the event's history.

Two hundred thousand visitors came to Washington for the inauguration, though several thousand never got further than Union Station. It was a cold, miserable day. The temperature hovered just



Herbert Hoover's inaugural parade moves up Pennsylvania Avenue during the intermittent rain that fell on his Inauguration Day in 1929.

above freezing, while wind-blown rain fell in soaking, slanting sheets. Thousands of soggy spectators stood for hours in the downpour under a canopy of largely ineffective umbrellas. As he rode from the White House to the Capitol for the swearing-in ceremonies, Roosevelt repeatedly leaned out the window of his limousine to wave to umbrellaed knots of people clustered like black mushrooms along Pennsylvania Avenue.

Undaunted by the cold, driving rain, thousands more had massed in front of the Capitol to witness the inaugural oath. Under the umbrellas, overcoats and raincoats predominated, but, despite the deluge, some spectators wore formal attire. On the inaugural platform itself, attendants dumped puddles of water from chairs as Cabinet members and Supreme Court justices waded down a waterlogged red carpet to their wet seats. Icy torrents blowing in under

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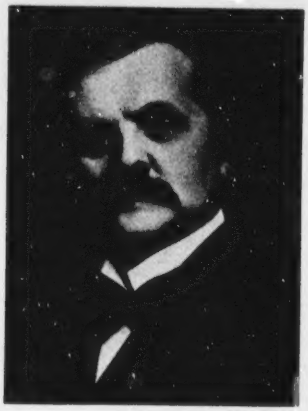
A dripping, smiling President and First Lady drive back to the White House in an open car.

Senator George W. Norris (R-Nebraska), whose 20th Amendment changed Inauguration Day from March 4 to January 20.



the roof bathed Congressmen, government officials, and guests alike as Eleanor Roosevelt raced back and forth, bringing blankets for family and friends.

The head of the Inaugural Committee tried to talk Roosevelt into taking his oath indoors but he refused, replying "If they can take it, I can take it," and led Vice President-elect John Nance Garner out to the inaugural stand. The shivering, soggy crowd burst into cheers as Roosevelt was sworn in at 12:39 p.m., his right hand resting on the cellophane-wrapped old Dutch Bible of Claes Martenzen van Roosevelt. All during his inaugural address, the rain beat steadily on the President's face, and several times he had to pause to wipe the water off.

Roosevelt insisted on an open car for the return ride to the White House. The thoroughly soaked President and First Lady rode the mile to the Executive Mansion laughing and waving to the crowds, which responded in kind. Later, Roosevelt spent another hour and a half watching the inaugural parade splash by from a specially constructed reviewing stand, an $11,000 model of Andrew Jackson's home, the Hermitage; he even had the bulletproof windows removed, the better to be seen and rained on.

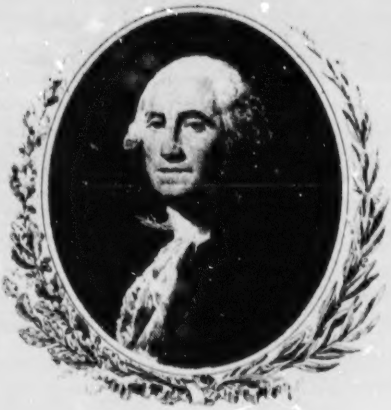
Said harried Senator George William Norris of Nebraska, whose amendment had changed the inauguration date to January 20: "They're trying to blame this on me. You can't charge this up to me until after March 4, when you see what kind of day that is."

It was, of course, a beautiful day—sunny, with a high temperature of 67 degrees, unusually warm for that date. ■

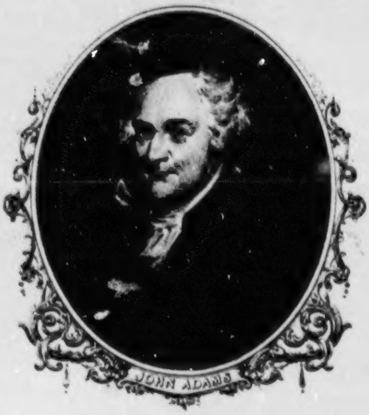
Inauguration Day Weather

1789–1973

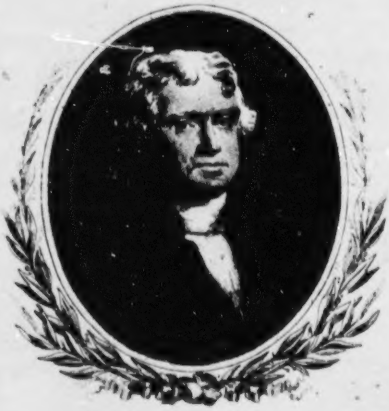
Temperatures are for noon. Except where noted, inaugurations were in Washington, D.C. Prior to 1937, the Presidential oath of office was taken on March 4: after 1937, on January 20, unless Inauguration Day fell on a Sunday.



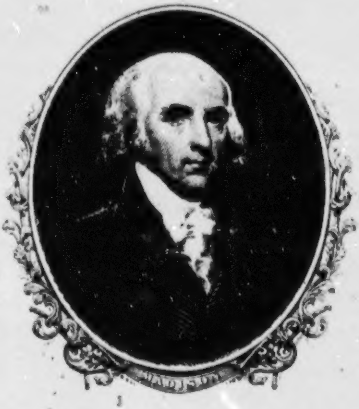
George Washington
April 30, 1789, New York City, cool and clear. 1793, Philadelphia, pleasant.



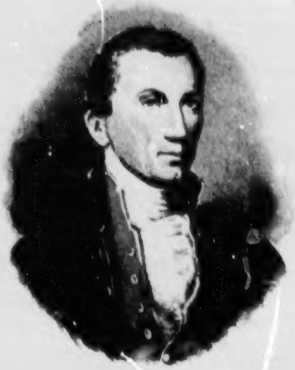
John Adams
1797, Philadelphia, fair.



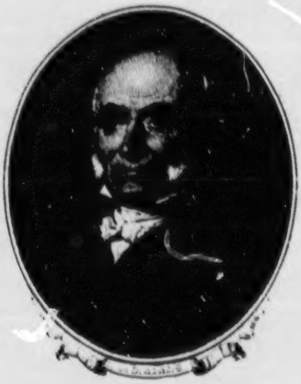
Thomas Jefferson,
1801, mild and beautiful.
1805, fair.



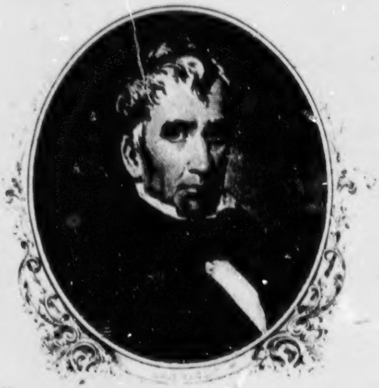
James Madison
1809, probably fair.
1813, probably fair.



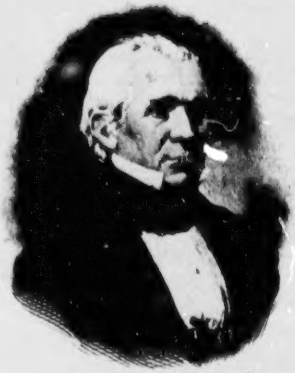
James Monroe
1817, warm and sunny.
March 5, 1821, 28°, snow.



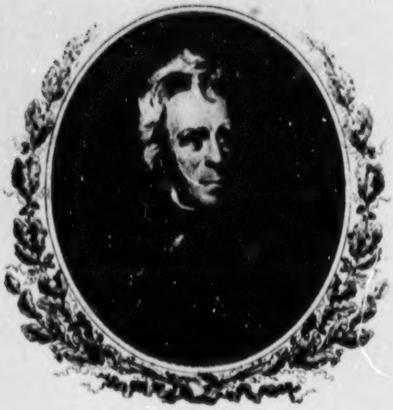
John Quincy Adams
1825, 47°, rain.



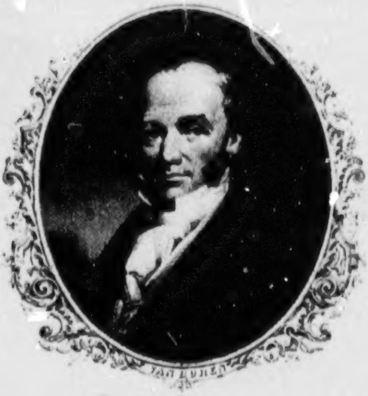
William Henry Harrison
1841, overcast, chilling wind.



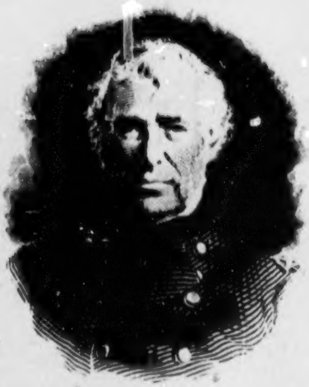
James K. Polk
1845, rain.



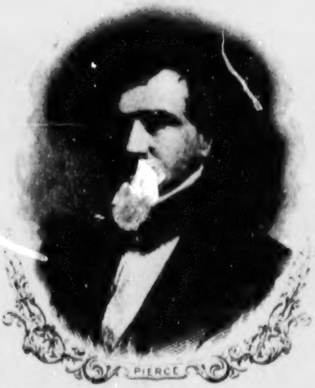
Andrew Jackson
1829, warm and balmy.
1833, probably fair.



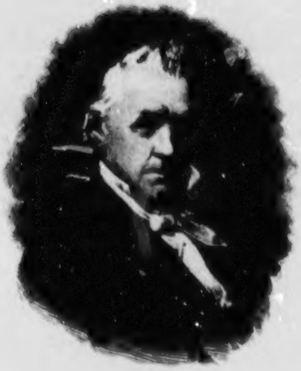
Martin Van Buren
1837, sunny and brisk.



Zachary Taylor
March 5, 1849, 42°, cloudy,
intermittent snow flurries.

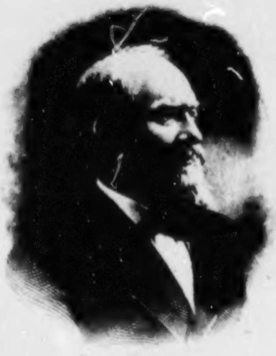


Franklin Pierce
1853, snow throughout the day.

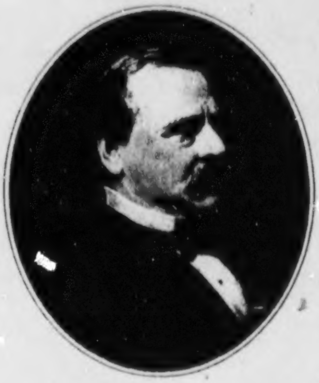


James Buchanan
1857, 49°, bright and sunny.

Abraham Lincoln
1861, rain till midmorning;
sunny and warm in afternoon.
1865, 45°, rain.

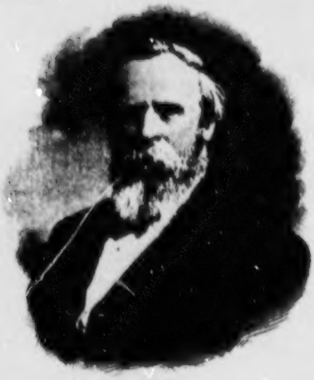


James A. Garfield
1881, 33°, snow until about 10 a.m.;
sunny, windy afternoon.

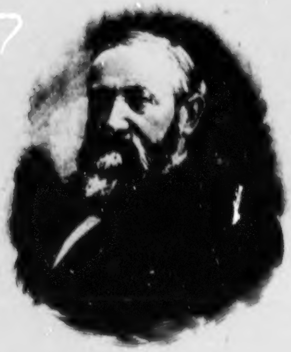


Grover Cleveland
1885, 54°, bright, sunny day 25°.
1893, snow and chilling winds.

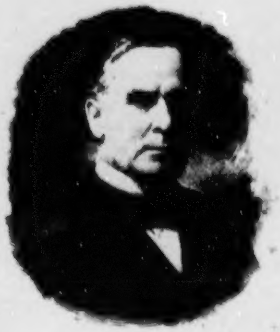
Ulysses S. Grant
1869, 40°, .106" rain, sunny afternoon. 1873, 16°, clear, windy and bitterly cold.



Rutherford B. Hayes
March 5, 1877, 35°, cloudy, brief periods of light snow.



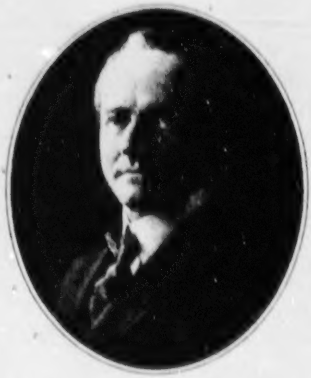
Benjamin Harrison
1889, 43°, rain all day, .86 inch.



William McKinley
1897, 40°, clear. 1901, 47°, overcast, rain began during ceremony.

Theodore Roosevelt
1905, 45°, sunny, patches of snow
on the ground, strong winds.

William Howard Taft
1909, 32°, heavy snow,
strong winds.



Calvin Coolidge
1925, 44°, mostly sunny.

Herbert C. Hoover
1929, 48°, .40" rain.

Woodrow Wilson
1913, 55°, overcast.
March 5, 1917, 38°, partly cloudy, windy.

Warren G. Harding
1921, 38°, clear, sunny.

Franklin D. Roosevelt
1933, 42°, cloudy. 1937, 33°, 1.77" rain.
1941, 29°, clear with brisk wind.
1945, 35°, cloudy, light snow on the ground.

Harry S. Truman
1949, 38°, mostly sunny, windy.

Dwight D. Eisenhower
1953, 49°, cloudy.
January 21, 1957, 44°, chilling wind.

John F. Kennedy
1961, 22°, snow in early morning;
sunny, chilling wind.

Lyndon B. Johnson
1965, 38°, cloudy, snow on
the ground.

Richard Nixon
1969, 35°, overcast, chill northeast wind.
1973, 42°, overcast,
chilling northwest wind.